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PSYCHOPHYSICAL MEASUREMENT METHODS

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The last review of the literature of the psychophysical measurement methods was given by Irwin (**32**), who noticed a continuing interest in questions affecting these methods during the period 1925–1933. The present writing covers the years from 1934 to 1936 inclusive. Only papers having some significance for the psychophysical measurement methods themselves have been studied; Weber's law, the Weber-Fechner function, the time error, and the judgment process as topics have been disregarded. For Weber's law and the Weber-Fechner function see Holway and Pratt (**29**), Telford and Denk (**64**), Oberlin (**47**), McGregor (**40**), Williams (**72**), Urban (**71**), Stevens and Davis (**60**), Zigler and Holway (**78**), and Wright (**76**). For the study of the time error and of the judgment process itself, see Woodrow and Stott (**74**), Woodrow (**75**), Needham (**42–44**), Gamisch (**14**) and Hunt (**31**).

General, Theoretical and Statistical

During recent years the fundamental logic of the measurement of psychological magnitudes has been subjected to analysis. H. M. Johnson (**33**) and McGregor (**39**) have written separately concerning the nature of measurement as it is carried on in psychology. McGregor emphasizes the fact that no measurement of any kind can have meaning unless a set of operations may be devised by means of which the measurement may be accomplished. He sets as his problem the question whether any real distinctions can be made between the measurement of physical magnitudes and of psychological magnitudes. The fact that measurement in physics and in psychology

presupposes the presence of an observer fulfills a basic assumption of operationism which McGregor finds helpful in handling his problem, for in both cases, in psychology and in physics, selective discrimination is the operation basic to all measurement. In this respect there is no difference between measurement in physics and measurement in psychology.

Both Johnson and McGregor are interested in examining the extent to which the data of psychology can meet the mathematical and logical requirements of symmetry, transitivity, of the commutative law and the associative law. McGregor points out that certain of the concepts of physics cannot meet these requirements; hence no valid distinction of more than limited generality can be made between measurement in physics and in psychology.

Johnson is more interested in dealing with the extent to which representative psychological concepts are susceptible of measurement. Perceptible brightness and perceptible hues, for example, he shows to fail in the property of additivity. Attitude measurement he attacks because it depends upon the assumption that the holding of an opinion predisposes the subject to appropriate action, an assumption which Johnson believes fatal to the possibility of attitude measurement because of the argument that opinions cannot be distributed along a continuum. "Opinions do not stand in a continuum. If opinions are the transforms of attitudes, then attitudes do not stand in a continuum" (33). A conclusion of Johnson's which McGregor might well have made maintains that many problems now being attacked by quantitative methods might be more profitably attacked by qualitative methods. "Those data should be measured which can be measured; those which cannot be measured should be treated otherwise" (33).

Both of these papers are of particular interest in view of the recent efforts which have been made to develop a scale for the measurement of loudness. The methods used in this work bear little resemblance to the conventional psychophysical methods; in part they are an outgrowth of a fresh point of view coming from the physicists and in part they are a consequence of the fact that advantage may be taken of certain of the facts peculiar to audition.

Abbott (2) discusses the general question of loudness scales, dividing them into 2 classes, the physical scales and the psychological scales. The decibel (which has been used in the construction of both physical and psychological scales) he finds to be a not altogether satisfactory unit for the scaling of loudness, not only because of the fact that scales using it as a unit are cramped in one range and extended in another, but also because of the fact that they are inconsistent when referred to different zeros (a frequent occurrence) and

different pitches. Churcher (6) has similarly criticized the decibel scale. He writes that the use of the decibel scale is defended mainly on grounds of expediency (grounds upon which Abbott is inclined to believe the scale lacking), and that as a matter of fact the decibel scale has no foundation as a loudness scale. Churcher is particularly impressed with the fact that the relationship between decibels and psychological loudness is not linear.

Among the scales which Abbott and Churcher separately criticize is the one developed by Fletcher and Munson (12). Fletcher and Munson were particularly interested in the development of methods which would define, measure, and permit them to calculate the loudness of complex sounds. Following the proposals of the Sectional Committee of the American Standards Association on acoustical measurements and terminology (1), they adopted the standard definitions of sound intensity, reference intensity, intensity level, reference tone, and loudness level. At the outset of their experiment they noted that the essential difficulty to be overcome in the development of a method for the measurement of loudness resides in the fact that while addition of the intensities of the individual components of a complex tone gives the intensity of the complex tone, addition of the loudnesses of the components has failed to give the loudness of the complex tone. They began their attack upon this difficulty by defining the loudness of a complex tone as:

$$N = G(1000, L) = \sum_{k=1}^{k=n} b_k(1000, L_k)$$

where N is the loudness of the complex tone, $G(1000, L)$ is a function of a 1000-cycle tone of loudness level L, b_k is a measure of the fractional reduction in loudness in the kth component due to its presence in the complex tone, and $G(1000, L_k)$ is a function of a 1000-cycle tone which is of the same loudness as the kth component of the complex tone. The usefulness of this formula depends upon the investigator having at his disposal equations connecting loudnesses of dissimilar pitches. These relationships are given by Fletcher and Munson in the form of loudness level contours, which are curves showing all points determined by frequency and intensity which yield the same loudness. Argument and experiment result in the determination of values for function G and a method of calculating b_k. The solution of these problems results in an experimental and mathematical technique by means of which the psychological loudness of a complex tone may be represented on a scale ranging

from 0 for sub-threshold intensities to 1,266,000 for physical intensities at 120 db. In general, a property of these numbers is the fact that when a group of observers judge the loudness to be doubled, the corresponding numbers will be in ratio of 2 to 1.

Agreement with Fletcher and Munson's results is reported by other workers. Geiger and Firestone (15) used Fletcher and Munson's numbers (prior to their publication) to predict the loudness of sounds reduced by given fractions, and noted close agreement between the observed and predicted loudness levels. These investigators, incidentally, report that to the majority of their observers, fractional or multiple loudnesses have as much meaning as does equality in loudness when sounds of different complexity or frequency are compared. This is an important point, because other investigators, in particular Stevens (61), have been interested in the use of fractionation methods in the measurement of loudness. Kingsbury (35) reported data at an earlier date which when tested after the publication of the numbers was shown to be in close agreement with what was to be expected according to Fletcher and Munson.

Baier (3) has written an extensive history of the problem of scaling loudness and has also submitted the Fletcher and Munson numbers to a thorough test. He was able to report that the observed and calculated values showed good agreement. The exceptions were interpreted as being due to the effect of the pitch of the comparison tone upon the loudness of the complex tone.

Churcher (6) has criticized the Fletcher-Munson formula on 2 points. In the first place he remarks that the formula for N (the loudness of the complex tone) does not take into account the extent to which the components of the complex tone are in harmonic relation. He points out in the second place that their method rests too heavily upon the theory that particular pitches are in close correspondence with circumscribed areas of the basilar membrane. No rejoinder to date has been made to these criticisms, which represent the only direct attack to which Fletcher and Munson's work has been submitted.

Churcher believed that there were other ways in which to attack the loudness problem besides studying tone combinations.

He devised a scale in which the number 100 was assigned to the degree of loudness evoked by a tone 100 db above threshold (in the case of binaural hearing) and the number 0 to the loudness evoked by the reference pressure. Taking advantage of the fact that sounds heard binaurally are twice as loud as sounds heard monaurally, and that it seems possible to state when a given

sound has increased to twice its loudness, Churcher assigned his numbers from 1 to 100 in such a way that the numbers were in ratio 2 to 1 as the sounds were reported in loudness 2 to 1. Churcher's methods have been adopted by Stevens (**61**), who has worked with loudness, and by Stevens, Volkmann, and Newman (**62**), who have worked with pitch. Stevens adjusted Churcher's loudness curve so that unit loudness occurred at 40 db above threshold (in the case of a 1000-cycle tone). For this unit he suggested the name *sone*. Stevens, Volkmann, and Newman applied similar methods in devising a scale for the measurement of the psychological magnitude pitch. In their experiment the pitch of a 1000-cycle tone was assigned the number 1000 and the unit was named the *mel*.

In summary of this work it should be pointed out that the investigators uniformly have been aware of the peculiar difficulties besetting psychological measurement Johnson and McGregor mention. Stevens (**61**) in particular has written in extension of the point of view expressed by McGregor, showing the basis of the measurement of loudness in operationism. The binaural-monaural and the fractionation techniques used by Churcher, Geiger and Firestone, Stevens, and Stevens, Volkmann and Newman have both been helpful in meeting in part the formal mathematical requirements laid down by Johnson. To what extent the requirements have been met depends upon what interpretation the critic makes of the subject's error in this kind of experiment. It may be argued that the margin of error encountered in matching standard loudnesses after fractionation and multiplication of loudnesses is greater than experimental error should permit. Workers in the field, however, are satisfied to explain these discrepancies on the basis of experimental error. If a contrary view be taken, the measurement of loudness by means of Churcher's unit or Stevens' *sone* runs afoul of Johnson's argument, since we would have to deal with a situation where $2\frac{(x)}{2}+x$.

The nature of the arguments made by psychologists interested in this work indicates that Bridgman's epistemology has received their acceptance. A serious question arises in connection with the subject's report as to whether he can carry through the operations demanded of him by the experimenter. In general the subjects used by Geiger and Firestone, Churcher, and Stevens do not find it particularly difficult to report with assurance when a tone has doubled or halved its loudness. Stevens, Volkmann, and Newman, on the other hand, report that some subjects find it difficult to report the fractionation or multiplication of pitches. One subject is reported who happened to have had musical training and who was confused

by his recognition of the conventional musical intervals. Efforts to conceive of zero pitch likewise were disturbing.

Further interest in scaling methods, apart from those pertaining to loudness and pitch, was shown by Barnhart (**4**), who reported a high correlation between the results of the method of single presentation and the method of paired comparisons when used in the scaling of affective judgments. Barnhart reported further that the 2 methods yielded approximately the same scale values. Since the method of single presentation conserves time it should be useful, particularly with group experiments.

Despite the fact that the conventional psychophysical methods have been known and used for many years, they still present questions. For example, the interdependence of h and c in Müller's substitution $c=hL$, the consequences of which were mentioned by Lufkin (**38**), is discussed by Holway (**28**). Holway reminds the reader that the mathematical interdependence of h and c renders the use of the method of least squares illegitimate. Instead of Müller's substitution, Holway suggests the substitution $h=\frac{1}{\sigma\sqrt{2}}$ in the observation equations. This attack gives equations linear in L and σ. Solving the normal equations yields values which, when compared with those reached by Müller's substitution, are found to be identical. Holway's paper is important not only because it places the derivation of the limen upon a more solid mathematical basis, but also because he believes that his treatment will throw light upon the disputed problem of the finding of the probable error of the limen. That there has been no practicable solution of this problem is pointed out by Linder (**37**), who made an empirical study of 100 thresholds based on frequencies which he obtained by making selections from Tippett's *Random Sampling Numbers*. The thresholds, while fictitious, accorded with the fundamental assumptions of the phi-gamma hypothesis. The advantage in using fictitious thresholds lies in the fact that variation of a sampling nature is the only sort of variation affecting the value. On the distribution of 100 thresholds, calculated by the method given by Brown and Thomson, Linder calculated the standard deviation. This number was reduced to give the probable error, which was compared with the various "probable errors" calculated by means of formulæ given separately by Boring, Culler (2 formulæ), and Thomson. Only Thomson's formula approximated the obtained probable error closely enough to warrant explanation of the difference on the basis of sampling error. Linder concluded that because Thomson's formula involves a prohibitive

amount of computation, the psychophysicist is left without a satisfactory measure of the sampling error of his procedure.

Helson and Burgert (27) are concerned with the use which shall be made of reports of 2 points when the subject is stimulated by a single point in the determination of the two-point limen. The authors point out that in advance of experimentation they can predict the number of errors of this kind (*i.e.* the number of reports of 2 with zero separation of the points of the aesthesiometer) with almost the same certainty as they can predict the number of normal judgments from the stimuli ordinarily used in determining the two-point threshold. Experimental justification is given for this assertion. The *Vexirfehler* decreases with increasing precision when the threshold remains constant and it decreases as the threshold increases if the precision be held constant. The anomalous case therefore finds a rational explanation in the phi-gamma hypothesis itself, particularly if zero separation of the points is regarded merely as the limit of a decreasing series instead of a stimulus *sui generis*. Additional psychological or mathematical assumptions are unnecessary.

The question of what interpretation is to be given the subject's report in the psychophysical experiment continues to excite attention. A further contribution to the discussion of the question involved in the Boring-Johnson controversy of some years ago is made by Graham (18), who writes that 2 questions are involved in the problem of interpreting the subject's response: (1) the question of what the experimenter is observing, and (2) the question of how the observed data are to be explained. Graham argues that a stimulus-response relationship is observed in the psychophysical experiment; the hypothesis that conscious states are observed is made difficult because conscious states include events which are not amenable to characterization in terms of the fundamental systematic concepts of science, space, mass, and time.

A most important contribution to psychophysics in particular and to psychometrics in general, is made by Guilford with the publication of his textbook on the psychometric methods (22).

This text comprises two sections, the first dealing with the psychophysical methods and the second dealing with the psychological scaling methods. Appendices include Urban's table, Rich's table, and Hoisington's table. In the first section, dealing with the psychophysical methods, Guilford has used the problems involved in the method of average error, method of limits, method of equal-appearing intervals, and the constant methods as an opportunity for the development of descriptive statistics in general. This is a very fortunate choice to have made because it should result in an understanding on the part of the

beginner that the statistical methods used by psychologists whether they be interested in psychophysical problems or not, are cut from the same cloth. A particular virtue of this book is the fact that it deals not only with statistical techniques of use in measurement, but also with experimental techniques. It contains much useful information concerning the applicability of the psychophysical methods in various experimental situations, much of which is not readily available in other secondary sources. It also contains complete bibliographies.

A new journal, *Psychometrika,* devoted to the application of mathematical concepts to psychological theory, made its first appearance in 1936 under the auspices of the Psychometric Society.

Critique of Methods

Pfaffman (**48**) has compared the method of single stimuli with the constant method in application to gustation. He finds no difference in the results whether they be compared with respect to the form of the frequency distributions, the measures of precision and sensitivity, in changes of measures with practice, or in the magnitude of the time errors. Both distributions give approximately the same degree of fit to the normal distribution. In general, Pfaffman reports that the method of single stimuli is as adequate and certainly more convenient than the constant method for experimentation in gustation.

Tinker (**69**) studied the limen and the average as measures of visual apprehension. He found the limen markedly higher in value than the arithmetic mean, with little difference in the magnitude of the sampling error. Tinker believes that the nature of the task set by the experiment determines whether the limen or the average should be used.

Woodrow (**75**) notices that the midpoint of the interval of uncertainty is frequently not a proper value for use in the study of the time error. He bases his assertion upon the fact that when the observed relative frequencies are sufficiently skewed, the phi-gamma hypothesis is not applicable in the treatment of the data. He further writes that different conditions of skewness may well be one among the numerous causes of the notorious discrepancy in the conclusions reached concerning the temporal indifference interval. The proper method of dealing with the time-error problem, writes Woodrow, is to study separately the relative frequencies of response resulting from the comparison of each variable with the standard.

The use of the equal judgment in the constant method had been attacked by a series of experiments undertaken by Kellogg on the one hand and Fernberger and his students on the other.

Using a reaction time technique, Fernberger, Glass, Hoffman, and Willig (**11**) now report results which indicate that a greatly increased reaction time in the case of equal judgments may be obtained from the subjects by training them in an intolerant attitude toward the equal category. These recent results reconcile the differences in the conclusions reached by Kellogg, who had previously reported greatly lengthened reaction times in the case of equal judgments, and by Fernberger, who had reported that he could find little lengthening in the time taken to report judgments in the equal category.

In an important paper to be considered in detail later, Thorne (**66**) has written of his difficulty in applying the constant method to the problem of ascertaining the value of the lower threshold for visual experience.

In certain preliminary experiments using the constant method Thorne encountered a series of inversions in his data. The outcome of the main experiment showed a changing value of the lower threshold (determined by the method of limits) with some indication of cyclical variation. The inversions seemed to be due, therefore, to a shifting psychometric function. The impossibility of using the constant method under these conditions needs no emphasis. A similar difficulty was encountered by Karwoski (**34**) in his study of the sensory consequences of mescal intoxication. In Karwoski's experiment, however, the mescal intoxication which was being studied introduced factors into the experimental situation which could not be controlled. Karwoski gives a series of principles which ought to be observed in any further psychophysical experimentation concerned with the effects of mescal intoxication. Difficulty in securing results with the constant method was also reported by Zoll (**79**), who tried to determine the thresholds for auditory volume. As in Karwoski's case, the difficulty appeared to have been due to factors other than those which might be attributed to the constant method itself. Stevens (**59**) gives a brief history of the work on tonal volume and reports that the difficulty in applying the constant method to it arises because the subject has difficulty in keeping the criteria of volume in mind. Stevens recommends the method of average error because it provides an opportunity for the subject to manipulate the tones and thus to stabilize the criteria.

Gordon (**17**) has given further consideration to the results of her experiment on the group judgment. In her first experiment, Gordon reported that the mean of the correlations between the true order of a series of weights and each of the orders given by a large number of subjects was much less than the mean of the correlations between the true order of the weights and orders obtained by grouping the subjects' reports. As the number of individuals in the group increased Gordon reported that the mean r increased. Upon this observation was based the conclusion that the judgment of the group is better than the judgment of the average member of the group. Stroop (**63**) had criticized the conclusions of the original experiment

because the method seemed to him merely to fulfill the requirements of the Spearman-Brown reliability formula. Gordon has now published the details of her original data, together with data from a playing card experiment in which chance alone determined the order in which the cards were drawn. The results of the card experiment indicate no increase in correlation with the grouping of the data. However, the mean r when the drawings are ungrouped is zero, and by the Spearman-Brown formula zero correlation would be expected if the data were consolidated according to Gordon's method. Consequently the experiment reported does not appear to contradict Stroop's assertion.

It might be pointed out that Stroop likewise performed an experiment with chance orders in which, for some undetermined reason, the mean r with ungrouped data was —.034. Amalgamation of the data into larger and larger groups resulted in an increase in the absolute value of the coefficient. Bruce (**5**) confirms Gordon's results in his experiment using judgments on weights and on dots. Neither Gordon nor Bruce compared their obtained increases with what should be expected according to the Spearman-Brown formula, although the degree of skewness in the distributions of coefficients would undoubtedly make this a difficult task.

Factors Affecting the Results of Psychophysical Experiments

The great interest on the part of physicists in the problem of measuring loudness has led them to inquire into the factors which may affect the results of the psychophysical experiments in which they are interested.

Montgomery (**41**), for example, summarizes the factors affecting the results of experiments on the measurement of difference thresholds in audition, and gives a list of causes which may be investigated if the subject is variable in his responses. All of the factors have been reported previously. Steinberg and Munson (**58**) have studied the variability of the lower threshold for intensity in the case of 3 tones (100, 1,000, and 5,000 cycles) among 100 subjects. They attempted to discover, if possible, the cause of the obtained variability. Little of it was due to differences in the experience of the subjects. In general the level and character of the sound seemed to be the most important physical influences contributing to the variability. The major factor, however, appeared to be individual sensitivity to sound. Subsequent experiments with individual subjects indicated that the method used (constant stimuli) produced surprisingly constant results.

The influence of configurational factors in the visual field upon the differential brilliance limen was investigated by Hovey (**30**). Using the constant method, the subject was required to report

whether the field was evenly illuminated or whether a sector of increased brilliance could be discerned. Hovey reports that the slope of the ogive (plotting the magnitude of the difference against the percentage of correct reports) is affected by motion either real or phenomenal, by modulation (change in intensity at a fixed rate), and by alternation. The effect of rate of application of the stimulus (or of modulation, as Hovey called it) upon the limen has also been studied by Grindley (**19, 20**) and by Drew (**8**). Grindley showed that the DL decreased rapidly as the rate of application of pressure, touch, and pain stimuli increased. Drew confirmed Grindley's thesis in the field of vision as well as the conclusions suggested by Hovey's results.

A number of investigators have been concerned with the problem of the effect upon the threshold in one modality, with simultaneous stimulation in either the same or different modalities.

Schiller (**54**) in a non-experimental paper refers to earlier papers in which he demonstrated changes in the brightness of colors following stimulation with changing pitches. Hartmann (**26**) gives a summary of the history of this problem and writes that if the observer be exposed to a bright light, his discrimination for tonal differences (both pitch and intensity) seems finer. Thorne (**66**) reports that simultaneous auditory stimulation produces both facilitative and inhibitory effects upon the lower threshold for vision. Thorne was inclined to explain the alternating effects as due to a figure-ground relationship; *i.e.* when the simultaneous stimulation is strong enough to become the figure in the perception, it exerts an inhibitory effect; when it continuously occupies the ground its action is facilitative. This assertion is based upon the introspections made by those who acted as subjects (including Thorne himself). Serrat and Karwoski (**55**) were not able to confirm the results reported by Hartmann, by Schiller, and by Thorne. They report that visual sensitivity as measured by the thresholds for light and for color is not enhanced with simultaneous stimulation by an auxiliary sound stimulus. Serrat and Karwoski are inclined to believe that Hartmann's values are small enough to be accounted for by the operation of mental set, preferences between stimuli, etc. Pratt (**50**) likewise could find no effect upon the time error in one modality dependent upon simultaneous stimulation in another.

Kravkov (**36**) discusses his 1930 and 1933 papers dealing with the fact that the visual acuity of the right eye (when the field consists of black objects on a white background) is improved by illumination of the other eye. If the field be reversed, *i.e.* if white objects on a black field be used, simultaneous illumination of the other eye results in deterioration of visual acuity. The conclusions of this experiment had been questioned by Hartmann (**24, 25**) who had maintained that the effect of simultaneous stimulation was to increase acuity in

all cases. Kravkov's criticisms are directed at the fact that Hartmann's method did not permit the subject's eye to adjust to normal acuity during the course of the experiment; hence the experimental control was defective. Gage (**13**) reports results which bear upon the change in the difference threshold for audition in the one ear accompanying varying auxiliary intensities in the other. When the intensity in one ear is less than the intensity in the other, the sound in the first has little effect upon the difference threshold in the second. When the 2 intensities are alike, the DL in the critical ear is increased and the effect becomes the more marked as the simultaneous intensity is increased. After a certain point, however, a maximum in the curve is reached and the DL once more decreases. The maximum occurs when the sound in the off-ear is 15 db above the sound in the critical ear. Teplov (**65**) reports that an additional stimulus whose brightness exceeds the threshold not more than 10 to 13 times, functions to reduce the threshold for the main stimulus, while a brighter additional stimulus raises the threshold for the main stimulus. The purpose of the experiment was to show that Heymans' law of inhibition is valid as Heymans formulated it only for a certain range of extreme intensities.

In general it may be concluded that whatever intramodality or intermodality effects take place are sufficiently small to be considered negligible in the ordinary psychophysical experiment. In some cases experimenters have had to report that cross-modality effects could not be found. They are interesting today chiefly as they throw light upon the purely psychological problem of the unity of the senses. Similarly the effects of concomitant stimulation in the same modality are chiefly interesting because of the light they throw on the operation of Heymans' law.

The means by which the response is made has attracted attention from a number of investigators. Neet, for example (**45**), has made a comparative study of the results obtained from the application of verbal, manual and conditioned response methods to the determination of lower auditory thresholds by a modification of the method of limits. Two conditioned responses were used, the conditioned respiratory gasp and the conditioned eyelid response. The investigator reported that the verbal and the conditioned eyelid responses in general yield lower thresholds than the manual or conditioned respiratory gasp. The nature of the response, *i.e.* whether it be conditioned or non-conditioned, has in itself no effect upon the threshold value. Culler, Finch, Girden, and Brogden (**7**), who have

also reported on the measurement of acuity by conditioned-response techniques, write that when a modified form of the constant method or the method of limits is used, conditioned response techniques on the dog yield indices of precision which are comparable to those taken from the human subject. The fact that precision does not suffer from the use of CR techniques is also suggested by an examination of Neet's results, although he does not mention it.

Newhall and Rodnick (**46**) have studied difference thresholds of relative brightness obtained by 3 kinds of voluntary response, oral, manual, and pedal. They report that, after applying an abbreviated form of the constant method, the average threshold is independent of the reporting response. When, however, different amounts of force are required to operate the hand key, the greater the force required the larger the interval of uncertainty. Shen reports 2 papers concerned with the effect of handedness upon the subject's report. In the first experiment (**56**) the subjects were required to lift a pair of equal weights simultaneously. Shen was interested in knowing whether the subject would tend to refer his judgments to the one hand or the other. The results indicated that 9 of the 10 subjects reported the experience involved as heavier, but no preferences for the one hand as against the other seemed to obtain as a general factor among all subjects. In the second experiment (**57**) a definite handedness effect was shown. Ten subjects all of whom were right-handed showed underestimation of the standard weight when the standard was lifted with the right hand and the variables with the left. When, on the contrary, the standard was lifted with the left hand and the variables with the right, overestimation of the standard weight was encountered.

Preston (**51–53**) has made an experimental analysis of the intraserial effects first studied by Fernberger (**10**). He reports the presence of intraserial effects between judgments separated both by empty intervals of time and by intervening comparisons. He further shows that the subject's attitude as it is exhibited in the tendency to avoid the repetition of a given report tends to exert powerful influences upon succeeding reports, which result in a displacement of the psychometric functions. Guilford and Nelson (**21**) report findings using a variation of the technique used by Preston and by Shen (the equal stimulus technique). They show that when an observer makes successive judgments upon the pitch of a tone given in successive repetitions of a melody (the pitch remaining constant) few reports of equal are obtained.

Finner (9) reports on a design for interchangeable weight holders which will insure both standard and comparison weights receiving equal usage, thus controlling tactual and thermal factors.

Needham (44) has studied the effect of previous experience upon comparisons made of auditory intensities. He reports that when a given series is preceded by a series at a significantly different level of intensity, contrast effects are noticed which show up in an increase or decrease in the relative preponderance of reports of lesser or greater[1]. With practice these contrast effects may disappear. Needham (43) also reports that when the time interval between standard and comparison stimuli (auditory) increases, appropriate changes occur in the D%'s, which reflect changes in the observed preponderance of lesser or greater reports. These changes seem to be related to the absolute value of the comparison stimulus, *i.e.* when the comparison stimulus is 30 or 40 db, the D% becomes positive, indicating a decrease in the proportion of judgments of greater. At 50 and 60 db, on the other hand, the increasing length of time between standard and comparison stimuli results in a negative D%. Finally Needham (42) reports that the rate at which stimuli are presented (in the method of single stimuli) is a factor in the development of a negative time error. As the interval of time between successive stimuli lengthens, the relative frequency of judgments of greater increases, *i.e.* the D% becomes negative.

The Threshold

The proper definition of the threshold still excites interest. Hovey (30), for example, maintained that proper interpretation of threshold changes could be given only on the basis of consideration of the curves of the psychometric functions in totality. He noticed the fact, investigated on a larger scale by Thorne (66), that fluctuations in the 50% point are constantly occurring. No indices of goodness of fit were given by Hovey; consequently the extent to which his fluctuations prevented the application of the conventional

[1] Two separate phenomena have been described in the recent literature as contrast effects. Needham describes the effect upon a present judgment of preceding experience as a contrast effect. Preston describes the consequences of the avoidance of repetition within a single experimental series as a contrast effect. In view of the ambiguity which may result from the present practice, it is perhaps better to restrict the term 'contrast effect' to the phenomenon studied by Needham, and to refer to the phenomenon studied by Preston as an intraserial effect.

methods cannot be ascertained. Graham (**18**) gave passing consideration to the possibility of the threshold defined as a constant quantity, but concluded that the obtained value of the limen does not differ from other magnitudes with respect to the fact that a probable error must be attached to it. McGregor (**40**) argues that under carefully controlled conditions a threshold may be taken with relatively few judgments. With adequate control of the experimental conditions and the services of a trained observer even one judgment may be significant.

Thorne (**66**) communicates an important paper in which he challenges the statistical definition of the threshold. The purpose of Thorne's paper is to show that systematic variations in the threshold for visual intensity may be shown which are too large to be classified as the consequence of errors in the method of observation. Upon this fact hinges an attack upon the Müller-Jastrow-Urban definition of the threshold as well as upon the general applicability of the constant method. Thorne assumes that the measurement of sensitivity is conditioned by 3 factors, a stimulus-excitation factor in the psychophysical process, an excitation-response factor in the psychophysical process, and the errors of observation and experimentation which occur in the study of sensitivity. The errors of experimentation are subject to control whereby they may be reduced to a degree of influence less than would affect the results of an experiment. The remaining 2 factors may be studied as they contribute to a common effect, provided, of course, that adequate experimental method is available.

The method of limits was adapted by Thorne to yield certain reliability coefficients which would indicate the degree to which experimental error was eliminated, and conversely, the degree to which the distributions were affected by genuine change in the subject's sensitivity. Because the theory which is being developed depends upon the proper interpretation of these reliability measures, they deserve close scrutiny. When the method of limits is used, it is possible to set up a distribution of differences obtained by subtracting the threshold arrived at by the use of increasing values of stimulus from the corresponding threshold arrived at by the use of decreasing values of stimulus. If the threshold is a constant quantity, and if no errors of experiment are present, these differences should each equal zero. In the event that the threshold remains constant and the experimental errors follow a distribution determined by the conventional theory of error, the sum of the differences should equal zero, but the standard deviation of the distribution should be greater than

zero. The analysis of such a distribution of Thorne's data shows a mean difference well within the minimal photometer calibration, and a standard deviation about 1.5 times the minimal photometer calibration.

It is also possible to secure a distribution of differences between successive thresholds (values obtained by averaging the results of the increasing and the decreasing stimulus series). This distribution may likewise be analyzed and the mean difference, together with the standard deviation of the distribution, computed. When the 2 distributions are compared it is seen that the successive differences are, on the average, larger than the differences between the 2 corresponding thresholds obtained by each application of the method of limits. On the assumption that the experimental conditions were maintained constant from series to series and from sitting to sitting, it is seen that the threshold from series to series is exhibiting greater variation than it is within the series. Because the only variable left uncontrolled (granted the assumption made above) is time itself, and since there is no reason to expect that time can contribute to this variability, it is concluded that the variation from threshold to threshold is due to fluctuation in sensitivity.

A further consideration of the stimulus-excitation factor leads Thorne to identify it with the fundamental threshold quantity. From the neurophysiological standpoint the threshold is a measure of the amount of work which must be done on the organism to produce unit response. Although this amount of work may vary under different physiological conditions, it should be, according to the all-or-none law, a relatively constant entity in single nerve fibers. Consequently it is a reasonable assumption that the stimulus-excitation factor makes a constant contribution to the final value coming out of the psychophysical experiment. It is important to note that this latter orientation is one implied by the work of Selig Hecht, to whom Thorne acknowledges aid.

In view of the treatment accorded the errors of observation and the stimulus-excitation factor, Thorne argues that the threshold as the psychophysicist knows it is dependent upon the second factor, namely, the excitation-response factor. The application of his modified method of limits yields results which show a fluctuating lower threshold with some slight evidence of cyclical variation. This fluctuation is ascribed to changes in the excitation-response mechanism.

There are a number of applications of this point of view to the

classical problems of psychophysics. Fechner's negative sensations, for example, are explained on the grounds of the all-or-none law as it functions in the stimulus-excitation component in the case of very low physical intensities. Shifts in the level of sensitivity are described by changes in the value of the constant k in the Weber-Fechner function, which is redefined to include Heymans' coefficient of inhibition.

There are 2 criticisms which may be applied to this work. In the first place, the argument depends upon a very tenuous chain of reasoning, all of which hangs upon the interpretation of the observed fluctuations. The reliability method devised by the investigator did not permit the quantitative partitioning of the variation due to unreliable method, from the variation due to changes in sensitivity. Thorne has pointed out that some of the change, particularly the change in the direction of increasing sensitivity, could be accounted for on the basis of known factors not adequately controlled. Independent evidence existed, for example, which indicated that dark adaptation persisted throughout some of the experimental sittings in some subjects. Continuing dark adaptation, however, will explain increasing sensitivity but not decreasing sensitivity, and Thorne has many instances which indicate the existence of periods during which sensitivity diminished.

Secondly, nothing in the experiment itself confirms the fundamental assumption as to the 2 components of the psychophysical process. How constant would the all-or-none law operating in a complex nervous mechanism like the optic system render the threshold? That part of the discussion which concerns the theory of sensitivity seems therefore to the writer to be exceedingly speculative and without substantial grounding in experiment.

Applications

The application of either experimental or statistical psychophysical methods to a large number of problems, continues to occur.

Gurnee (**23**), for example, reports on thresholds for vertical movement of the body, which he believes had not been determined previously. Travis and Griffith (**70**) report on the measurement of the sensitivity of the finger tips to electrical stimulation by a method analogous to the method of limits. Zigler and Holway (**78**) used the method of single stimuli in order to determine difference thresholds for olfaction. Zigler studied (**77**) the relation of the two-point threshold to the error of localization. Woodburne (**73**) used the constant method for the study of binocular discrimination of depth differences.

A particularly interesting problem was attacked by Philip (**49**). This investigator was interested in the relationship between speed and accuracy in tapping. He sought insight into this relationship by holding his subjects within suitable ranges of speed and determining the accuracy of the subject at each speed. The accuracy was expressed as a per cent. When the per cent wrong was plotted against increasing speed, an ogive curve was obtained, which was treated by Urban's method. On the basis of the application of Chi-Square to some 60 ogives, yielding p values distributed acceptably, Philip concludes that the relationship between speed and accuracy conforms to the phi-gamma hypothesis. This application represents a further extension of a psychophysical method into fields quite foreign to its original field of sensation intensity.

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PUBLICATIONS, POLITICS AND ECONOMICS

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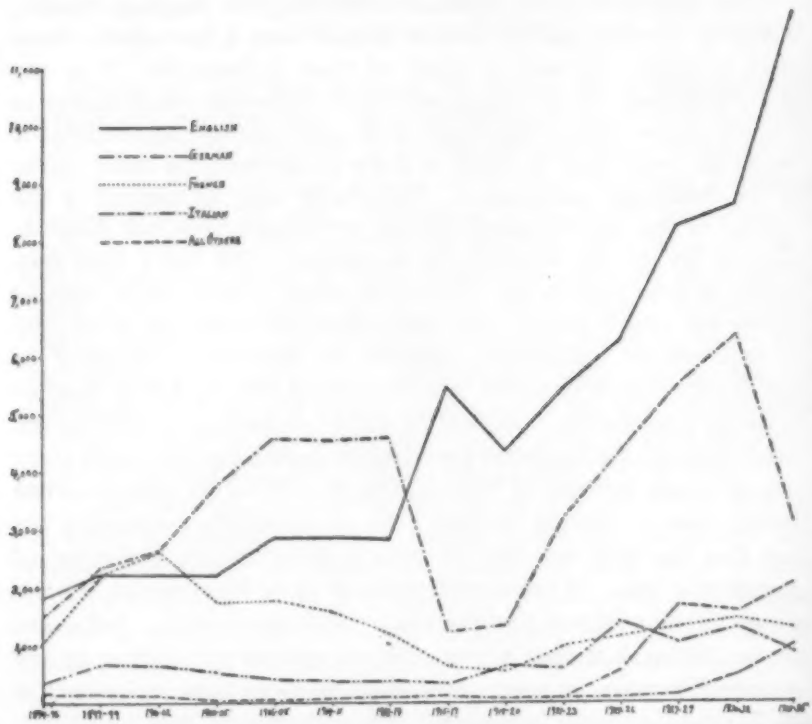
Psychology has been fortunate in having had a bibliographical service of long standing. The *Psychological Index* was first published in 1895 and consisted of a bibliographical listing of books and articles in psychology and related fields which had been published during each previous year. Publication of the *Index* was continued annually until last year, when it was discontinued because the complete abstracting service of the *Psychological Abstracts* rendered the publication of a simple bibliography unnecessary. Undoubtedly neither the *Index* nor the *Abstracts* completely covers the entire field of publication in psychology. Undoubtedly books and articles are published which are not abstracted or listed. But how complete this service has been may be imagined from the enormous total of 156,861 titles which have appeared in these listings from 1895 to 1936.

Some time ago, in order to impress upon graduate students the necessity of possessing a facile reading knowledge of foreign languages, the author ascertained the number of titles listed in these sources each year which had appeared in the different languages. The analysis since 1895 was made for English, German, French, and Italian, which, in the early years or until 1924, included practically all of the papers listed. Since 1926 the Russian titles were analyzed into a separate category. Titles in languages other than these were listed as "All Others." No attempt has been made to ascertain the actual country of origin in which the paper was written. This would have involved an enormous amount of labor and would have involved the looking up of the country of the author in a very large number of cases. By including all of the titles from the bibliographical source named and no others, the subjective factor of selection has been eliminated in the present study. The author knows of no other bibliographical source of such completeness, of such long standing, and which has continued under such unchanged editorial policy as that represented by the *Psychological Index*.

The results of this analysis appear in the accompanying chart. In an effort to smooth the curves and so eliminate incidental yearly

variations, totals are given for three-year periods rather than the annual results. It fortunately happens that many major political and economic occurrences fall within the limits of this particular grouping. It seems of interest to consider certain aspects of these curves as correlated with coincident political and economic events.

The unbroken curve represents the English language results, including America and the British Empire with a few others whose place of origin was not in either of these 2 countries. It is the writer's opinion that this curve represents American contributions to a much greater extent than those of all other origins combined but it would be a vast labor to break it down to ascertain the exact extent of the American contribution. The reader may be assured of the validity of this fact by consulting any psychologist who has a knowledge of the current literature of his subject. The curve rises very slowly at first through the 1912–1914 period, with a rapid increase during the next 3 years. This last reflects the rapid rise of interest in experimental psychology, especially in America. The effect of the World War is observed in a decrease of the number of English language titles for the 3 years 1918–1920. A decrease in this period, which includes the American participation during the war, while there was an actual increase of titles during the 1915–1917 period—when Britain was at war but America was not—certainly emphasizes the fact that the large majority of titles included in this curve are of American origin. In the consideration of all of these curves, it must always be remembered that there is a lag in publication. Influences are not felt until at least a year after the articles are written, to any considerable extent at least. Hence an article or book, completed in 1917, would probably be accepted for publication in that year but it would likely not appear until 1918 and would be included in the 1918 bibliographies. Hence, the period affected by the war period would be, for American publications, the years 1918–1920 rather than the years of our actual participation in the World War. The actual numbers for these critical years bear out the contention, expressed above, for the English language titles. The numbers are 1917—2,153; 1918—1,126; 1919—1,464; and 1920—1,769. The recovery had already begun by 1917. After recovering from the lean years of the war period, the English language curve rises very rapidly—so rapidly indeed that if this curve were extrapolated it would probably come close to infinity! This reflects the enormously increased interest in psychology since the war, especially in America.



THE NUMBERS OF PSYCHOLOGICAL TITLES WRITTEN IN DIFFERENT LANGUAGES IRRESPECTIVE OF THE COUNTRY OF ORIGIN. THREE YEAR PERIODS (1894–1935).

The only observable political or economic effect on this curve is that of the reduced number of titles during the war period.

The curve of titles in the German language is represented by the dot-dash curve and shows a very different trend. It rises more rapidly to a maximum in the 1906–1908 period—a maximum which is maintained until the beginning of the World War. Then, for the periods 1915–1917 and 1918–1920 (the war and post-war inflation periods), there is a very serious drop in the number of titles. Interestingly enough, bibliographical service was maintained with Germany even during the period of our participation in the war. The low was reached in 1917 with only 88 titles recorded in the German language, and by 1922 this had increased to only 432 titles. The effect of the war period was obviously not only more profound than in the case of English language publication, but it was also of greater duration. The continuation of the period of little publication through 1921 is unquestionably a reflection of the post-war inflation period in both Germany and Austria. By the 1921–1923 period, the curve begins to rise rapidly and steadily to an all-time maximum for German language titles during the years 1930–1932. The last bracket of years (1933–1935) shows a marked drop in German language publications. Results for 1936 and for the first 10 months of 1937 (not included in the curves) indicate little improvement. The interpretation of this last decline is probably to be found in a combination of 2 factors. In 1933, the first year of this period, the National Socialist Party gained control of Germany—and certainly Germany is the major source of psychological titles in the German language. The control by the National Socialist Party was gained after that country had passed through several years of extreme economic stress. Indeed, the marked decline occurred in 1932, although this year falls in the peak period of the curve. The actual figures by years are: 1930—2,658; 1931—2,616; 1932—1,063; 1933—948; 1934—1,099; 1935—1,082; and 1936—1,160. The decline is certainly due, in part and possibly in large part, to economic pressure and a period of economic stress. But certainly some part of this decline is due to the elimination from Germany and from the German educational system of many psychologists who do not conform to the ideals of the National Socialist Party.

The curve for French language titles, represented by the dotted line, again shows a different trend from those for either the English or German. It rises rapidly to a maximum in the 1900–1902 period—the heyday of Bergson and his school of thought—and then descends

consistently to a minimum during the war and post-war periods. From 1921 the curve rises slowly but steadily except for a slight decline in the last three-year period. Participation in the war and the period of post-war inflation had an effect, but an effect not as great as that for the English or German language publications, in reducing the psychological output in French.

The curve for Italian language titles, represented by the double-dot-dash curve, shows a still different trend. From a temporary maximum in 1897–1899, the number of Italian titles steadily declines to the first years of the World War. The 1918–1920 period shows a sharp rise, due in part to the publication of a number of articles on military psychology toward the end of and just after the war, and in part to the fact that Italians began to publish more largely in Italian. Before this time, many Italians published in German and French, and articles in these languages actually appeared in Italian psychological journals. Indeed the official languages in International Congresses of Psychology were only English, German, and French until recently.

In 1929 the International Congress of Psychology was held at Yale University. In reply to an invitation, the Congress Committee was informed by the Italian government that, unless Italian was added as an official language of the Congress, it would refuse to issue passports for the attendance of any Italian psychologists.

The period of 1921–1923 includes the year when the Fascist Party gained control of Italian internal politics. Thus government stimulation and the new ideals represented by the Fascist Party are the basis for a marked rise in the curve to a maximum in 1924–1926. This maximum is not maintained, however. During the next 3 periods (1927–1935), the number of Italian titles drops off, and the decline is even more marked for 1936 and thus far in 1937. The maximum in the first years of the Fascist regime can probably be explained by the many writings of Gentile and his group establishing the new ideals of education. The drop in number after the first years was to be expected, perhaps, after these new ideals had become crystallized.

The final curve for publications in languages other than English, German, French, and Italian, represented by the double-dash-dot line, needs no explanation through the year 1923. Up to that time only a few titles appeared in this "All Others" category, articles largely in one of the Scandinavian languages, Dutch, and Spanish. At the years 1921–1923, this curve bifurcates. The upper curve

includes all of the "All Other" titles including Russian and the lower curve all of these titles exclusive of Russian. The upper curve increases rapidly after 1923, largely due to the appearance in 1926 of a large number of Russian titles. In 1925, only 28 titles were listed including the Russian, while in 1926, there were listed 448 Russian titles and only 22 publications in the "All Other" languages. The number of Russian titles increased to a maximum of 592 in 1929, a maximum which has not been maintained, although the number of Russian titles for any year has never dropped below 200. In all fairness, it must be pointed out that the rapid and marked increase in the number of Russian titles is partly due to better bibliographical service. But certainly this increase is due in large part to the Soviet development of psychology within Russia, to its scientific approach to industrial and social problems, and to the expansion of the newer socialistic and communistic ideals. And also the growth of nationalistic feeling within Russia has led practically all of its scientists to write in Russian while formerly many of them wrote in other languages.

The lower bifurcation of the "All Others" curve, which includes all languages except English, German, French, Italian, and Russian, is of interest and seems to be capable of interpretation in terms of political trends. It moves upward, but the marked increase is somewhat delayed as compared with the Russian increase and actually occurs as late as 1931. The numbers are: 1929—89; 1930—99; 1931—194; 1932—192; 1933—288; 1934—284; 1935—420; 1936—488; and for the first 10 months of 1937—268 titles. One can see here an increase in the number of titles which reflects the increase in nationalistic sentiment of the smaller nations so that these nationals either from political pressure or because of patriotic feeling now write in their national language rather than in one of those more universally understood. During the first 10 months of 1937, besides papers in English, German, French, Italian, and Russian, summaries have appeared in the *Psychological Abstracts* of publications in Chinese, Czech, Danish, Dutch, Finnish, Greek, Japanese, Hungarian, Norwegian, Polish, Portuguese, Roumanian, Spanish, Swedish, and Ukrainian. Pity the poor psychologist who attempts to cover the literature of his field! It should be said again in fairness, that a certain part of this increase of titles in minor languages may be due to better bibliographical service, but undoubtedly it is due in very large part to the increase of nationalistic feeling among the smaller nations during the last decade. Emphasis is given to this interpre-

tation by the fact that new psychological journals have been founded recently in some of these smaller countries.

The analysis above indicates the various political and economic factors which seem to have a major influence on the magnitude of scientific publication. It must be assumed that the facts with regard to the number of psychological titles may be considered as an index for all scientific fields and possibly for all fields of intellectual endeavor. On the whole, as one would expect, war and periods of economic depression tend to decrease the volume of scientific output. On the other hand, the presence of new and crystallized political ideals and of a strong centralized government which tends to encourage and even to subsidize scientific research markedly increases the volume of scientific publication, as in the case of Italy and Russia. But if there is the presence of new political ideals and a strong centralized government which does not particularly encourage and subsidize research, as in Germany, there is apparently a decline in the volume of scientific output. Finally, the growth of strong nationalistic sentiment markedly tends toward publication in the national language even though such publication, for the smaller countries, must inevitably reduce the size of the audience to which the publication may appeal. The writer merely wants to point out these facts. He has no concern in evaluating these facts nor in interpreting them in the light of any particular political philosophy.

BOOK REVIEWS

RUCH, FLOYD L., *Psychology and Life*. New York: Scott, Foresman and Company, 1937. Pp. xiv+679.

Many elementary textbooks suitable for a general survey course in psychology appear and fill reviewers' columns and library space, retaining their pristine qualities by the fact that they are rarely opened and more rarely read. This is not likely to be the case with *Psychology and Life*. The first reason lies in the general make-up of the book. It is attractive in appearance and its illustrated inserts will surely go a long way toward arousing reader interest among students. Likewise, the chapter headings and introductory paragraphs give to the student the general impression that here is a book which will present understandable information applicable to his personal needs as well as inform him of the subject matter of psychology.

This characteristic of the book is understandable when we consider the manner in which it was written. Perhaps Dr. Ruch's own words, taken from the preface, will best indicate the point of view which gives this unique quality to the book.

> "I do not know exactly how many textbooks in elementary psychology have been written in the past thirty-five years. These books were all written in loyalty to something. All of them were dedicated to psychology: some to psychology as a science; some to psychology as an exact science; others to the author's system, or to the author's favorite professor's system. I have not seen a textbook of elementary psychology written under a vow of loyalty to the student as a certain member and possible leader of society. Inspection of many of these textbooks shows that space is proportioned out to the various topics roughly on the basis of the amount that is known about these topics, with an occasional distortion of this relationship in the regions representing an author's special interests. . . . I should like to indicate that this textbook in elementary psychology has, rightly or wrongly, been differently conceived." (P. v.)

In the book's make-up, considerable weight has been given to students' ratings of topics taught in elementary psychology. At the bottom of the list, so far as students' interest in them is concerned, are the topics covering nonsense learning material, animal maze learning, theories of audition, anatomy of sense organs and the brain, etc., whereas such topics as understanding one's own personality problems, their improvement and motivation; applications of psychol-

ogy to the training of children; the technique of reasoning out everyday problems; heredity *vs.* environment; how to study effectively, etc., are at the top of the scale in student interest. These findings are fundamental to the manner in which the book is written. To quote again from the preface:

> "Notice that the item *How to study effectively* is among the ten most interesting, while *The methods of studying the learning of nonsense materials* comes near the very bottom of a list of 122 topics. I do not propose that the psychologies of the future omit all mention of nonsense syllable learning because students find that topic uninteresting. I propose rather that the dynamic value of interest in learning how to study effectively be employed in teaching the student the basic facts of learning. By showing the student that *substance* learning is more efficient than *verbatim* learning we teach something about the factor of meaning as determining the rate of learning and at the same time teach him how to study more effectively. This example illustrates my fundamental theme and guiding principle in the preparation of this book. . . . In the category of the [material omitted from the book] come some of the more obstruse considerations of psychophysics, discussion of the highly controversial anatomy and physiology of the nervous system and sense organs, and much of the theory and polemics inherent in detailed discussions of the tenets of the various schools or systems of psychology. These, I feel, properly lie within the field of the advanced student and have insufficient interest and utility to permit their inclusion in a first course." (P. viii.)

The book is written in an easy personal style which is oriented directly toward the student. The slightly dramatized method of presenting facts and historical backgrounds to experimental problems may irritate some professors but probably very few of their students. From the student's point of view it is probably the most interesting and readable textbook that has been offered in psychology. It has an immeasurable advantage over most textbooks in that it is useful to the student. It tells *him* how and why *he* acts and thinks, and how and why such actions should be encouraged or changed, and this is done without the dogmatic display commonly found in attempts to relate the facts of psychology to everyday life.

The book is contemporary in appearance and viewpoint. In fact it is so contemporary in some respects that some danger exists of its losing interest value within too short a time for that reason alone. As an example, the illustrations preceding each of the four sections of the book are full page, borderless, smooth paper inserts, some of which have such familiar portrait subjects as Hitler, Roosevelt, Stokowski, Einstein, Ghandi, Lewis, Perkins, etc. One page, in particular, has two pictures, one of Secretary of Labor Perkins con-

ferring with Lewis, Murphy and Knudsen, the other of Rodin's *The Thinker*. (This illustration is used to indicate modern methods of solving problems by conference.) Such illustrations as the above could easily be changed to keep abreast of the times.

The reviewer does not wish to give the impression that because the book is written around the student's interests Dr. Ruch has overly slighted the traditional subject matter of psychology. It is true, however, that he has changed the emphasis of many traditional topics and directed them toward the student. This may best be indicated by the divisions of the book, the headings of which, when considered as a whole, illustrate this new point of view. The book is divided into four parts with chapter headings under each as follows: *Part I. Psychology and People* (pp. 184). (1) "The Subject Matter of Psychology" (pp. 41). (2) "Individual Differences" (pp. 33). (3) "Personality and Its Measurement" (pp. 37). (4) "The Origin of Individual Differences" (pp. 32). (5) "Intelligence" (pp. 37). *Part II. The Background of Behavior* (pp. 175). (6) "Emotions" (pp. 41). (7) "Emotional Development" (pp. 31). (8) "Motivation" (pp. 27). (9) "The Control of Personal-Social Behavior" (pp. 34). (10) "Dynamic Factors in Personality" (pp. 38). *Part III. Psychological Problems* (pp. 79). (11) "Psychology and Personal Problems" (pp. 38). (12) "Psychology and Social Problems" (pp. 40). *Part IV. Observing, Learning, and Thinking* (pp. 212). (13) "Attention and Perception" (pp. 37). (14) "The Special Senses" (pp. 44). (15) "Learning" (pp. 41). (16) "The Management of Learning" (pp. 30). (17) "Thinking and Language" (pp. 27). (18) "The Accuracy of Thought" (pp. 27).

At the end of each chapter is a bibliography of suggested readings. These bibliographies will prove more useful than most since each title has a paragraph indicating its subject matter, the prerequisite information to an understanding of its content, and an indication of its quality. For example, referring to Garrett and Schneck's *Psychological Tests, Methods and Results,* the information is given as "the title tells you what you will find here; authoritative and accurate." Or, the *Minnesota Mechanical Abilities Tests:* "Here you will find the details of the search for clusters of human abilities to which frequent reference is made in this book."

For some uses the book has a notable defect. It is better designed for large classes than small ones. Further, there will be some instruc-

tors who feel that psychology should be presented as factually and as nearly in the laboratory atmosphere as possible, the student to apply such facts according to his own necessities and interests, which are conceived as professional or preliminary to professional interests. However, the average large university class is made up of prospective teachers, students satisfying the college requirements for a course in the social sciences, others trying to squeeze in three more units toward graduation, and a relatively few students who are genuinely interested in what psychology has to offer as a profession. For such a class this textbook has no existing rival. Its information is directed toward the student, backed by a surprising range of experimental evidence and self-administering examples, and many students whose initial interests in psychology were limited to college requirements will, after reading this book, be aware of the subject matter and significance of psychology for themselves and society.

For small selected classes a textbook directed toward the material rather than the student may prove more useful in that such a book usually covers the materials of psychology (such as animal mazes, nonsense syllable learning, etc.) as important techniques in developing psychological theory. The student interest in such material is assumed to be correlated with his general interest in psychology. The subject index of Ruch's book illustrates this criticism. *Animals* are referred to twice in two short paragraphs, *maze* once in a single paragraph. Facts from such sources (*e.g.* animal maze learning in relation to drive and reward values) are presented as generalized statements: "Rats that are hungry and thirsty will learn faster to find the exit of a maze when food and water are found at the exit."

The back of the book contains references to source material, chapter by chapter, a name index, and a subject index.

Since this textbook represents a new approach to the problem of how to present psychology to an elementary class it has many novelties. To those who may be antagonized by this, the best answer is the magazines on their own desks and the book itself. The instructor who uses *Psychology and Life* may find his classes more interested in the textbook than in his lectures, and he may find considerable revision of his lectures necessary to bring them up to date and to the level of the textbook's awareness of the problems and interests of today's students.

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DASHIELL, JOHN FREDERICK, *Fundamentals of General Psychology.* Boston: Houghton Mifflin Co., 1937. Pp. xxiii+655.

DASHIELL, JOHN FREDERICK, *Manual to Accompany Fundamentals of General Psychology.* Boston: Houghton Mifflin Co., 1937. Pp. vii+117.

Special significance is attached to the appearance of Dashiell's textbook as a possible index of what has happened to behaviorism during the nine years that have elapsed since the publication of the first edition under the title *Fundamentals of Objective Psychology.* In his preface the author points out that "Much water has flowed under the bridge since the older manuscript was completed. . . . Objectivism (behaviorism) may fairly be said to have accomplished its mission of restoring the equilibrium of a science of human nature that had gone exclusively mind-gazing with the extreme post-Wundtian introspectionists. On the other hand, the ultra-simple and flinty concepts of the molecular behaviorism have been liberalized by a number of independent developments that have somehow combined to enrich the picture of genus *Homo sapiens.*"

Even from superficial examination of the new book it is clear that the process of revision has been very extensive. The introductory chapters have been fully rewritten and should be very helpful in orienting the beginning student and dispelling the erroneous attitudes with which he may approach the study of psychology. The subject of native reaction patterns has been expanded from one chapter to three covering hereditary background, individual development, and emotion, with greatly increased consideration of the problem of maturation. The chapter on motivation has been enlarged to two, with the addition of material on attitudes and on reactions to frustration. Some configurational principles have been added to the treatment of perceiving; although no mention is made of the problem of constancy. The chapters on social behavior, thinking, and personality have been extensively rewritten, and the omission of any treatment of fatigue and efficiency in the first edition has been remedied by an entire new chapter.

Since he is writing a general psychology, the author has not given separate consideration to fields such as child psychology, animal psychology, abnormal psychology, etc., but has included much of the factual material of such fields in the discussion of more general topics. Some of the specific omissions, however, are difficult to understand.

For example, one cannot find in the index any reference to *dreams,* although he may discover *Drosophila.* He cannot find *hypnosis,* although he may find *hypothalamus;* not *amnesia,* although *alveoli;* not *figure-ground,* although *fibers in nerve trunks;* not *Freud,* although *Fechner.*

The book makes little contribution to the logical integration or systematization of the subject matter of psychology. Whereas the former edition was frankly and courageously polemical in its behavioristic point of view, the new edition has sacrificed consistency to eclecticism. The author has admitted introspective data as scientifically valid, but by stressing the antagonism between the objective and subjective method he has denied the possibility of a unified science and has found himself reduced to the task of emphasizing the relative advantages of the objective approach. For example, the former chapter heading " Postural Responses " has become " Set and Attending," and a discussion of subjective clearness is added, although the author finds " that the subject's observations concerning his experiences parallel what his experimenter observes in his posturings and conduct, so that the findings and the general principles and laws of attention can be pretty completely stated in objective terminology " (p. 328). In discussing emotion, it is now possible to include a treatment of the James-Lange theory, even though it is finally dismissed as " an academic and almost purely a technical question " (p. 171). In most instances, however, the experimental data derived from verbal report are incorporated without self-consciousness or apology, and only occasionally does the author feel impelled to set such material apart by headings such as " Introspective analysis of light," or " Some subjective aspects of fatigue." Naturally, also, he finds it difficult sometimes to maintain a consistent basis for differentiation. Although color blindness and color contrast are treated objectively, the classification of colors into the four primaries is labeled introspection. Then, when he comes to theories of color vision he rejects the Young-Helmholtz theory in favor of the Hering theory which derives its greatest superiority from the " introspective " fact of the four primary colors!

The logical difficulties, however, extend further than the epistemological problem. The author naturally attempts to derive complex behavior from more simple behavior, but the derivations are questionable in some instances. In order to achieve a unified theory of learning, there is repeated emphasis upon the general principle that a problem situation arouses random behavior, in the course of which

" the organism, persisting in its efforts to right the situation, *chances upon a solution*" (p. 36). Later, in the chapter on learning, it becomes difficult to maintain this principle of chance solution. The subjects in Hamilton's experiment are described as showing behavior that ranged " by degrees from the stupid repetitious pushing against the same door to a process of rational inference " (p. 378). And in discussing Köhler's chimpanzees it is pointed out that the ape " happens in the course of his random and sometimes wild activity to get into a position where he seems to see some connection between the unreachable food and the object lying handy. At the same time, there is here surely some degree of perceiving of the *relation of means to objective*" (p. 394). Nevertheless, the author concludes, in summarizing the chapter, that "*These ultimately selected responses originally occur 'by accident'*" (p. 402).

A similar difficulty is apparent in the treatment of motivation. The primary organic drives are all reduced to *afferent stimulations* arising from local or general tissue-conditions, although in order to accomplish this purpose it is necessary to overlook the rôle of appetite in the hunger drive, of hormones in the sex drive, and of blood temperature in the regulation of body temperature. And later, in discussing memory, the author achieves his integration by classing intent to learn, active attitude, knowledge of results, etc., as the subjects' *organic* conditions of motivation and set (p. 411).

In other instances the author has neglected the possibilities of integrating the experimental material more closely. For example, the concepts of transfer and interference, retroactive inhibition, and distributed practice are treated independently with no suggestion of their interrelations. And the subdivision of the topic of memory into the separate problems of acquiring, retaining, reproducing, and recognizing, is apt to be confusing with respect to the factors determining each process. The laws of frequency, recency, primacy, and intensity are presented as laws of reproducing rather than of acquiring; alteration of general stimulus conditions is mentioned only as a factor in reproducing, while retroactive inhibition is seemingly involved only in retaining.

In many respects the point of view of the book is physiological rather than behavioristic, if such a distinction can be drawn. For example, the threshold is treated as the liminal energy for activating a receptor, rather than for determining a discriminative response. As a consequence, it is impossible to understand the sources of the

variable or constant errors in threshold measurement, and likewise impossible to deal with the problem of the effects of sub-threshold stimuli.

The physiological emphasis is also shown in the prominence given to the subject of the nervous system. Although the author states in his preface that the newer knowledge has served to discredit the use of neurons and of reflex arcs as complete explanatory bases of behavior, he has not reduced the number of pages devoted to these topics. This is a perennial problem in textbook construction and each author has a right to his own point of view. Dashiell explicitly states that "the help of neurology to psychology is likely to be more in *general points of view* than detailed explanations of particular cases" (p. 286). The reader, therefore, will not expect to find the facts of neurology used in explanations throughout the book. Indeed this is almost precluded by the fact that the chapter on neural organization of behavior follows the chapters on heredity, maturation, motivation, emotion, and sensory functions. The reader, however, will be somewhat surprised to encounter in the discussion of the physiology of the synapse the statement that "It should now be plain that any theories concerning the way in which neural discharges take the routes they do lie at the base of most psychological problems. For one thing, the theories offer interpretations of 'learning' and 'habit' as well as of 'maturation' and 'development.' Further, they suggest interpretations of 'attitude' and 'attention,' of 'set' and 'directing tendency,' of 'memory' and 'recall,' of 'associations' and 'thinking'" (p. 268). The author, however, has not attempted to develop any of these interpretations.

It is probably inevitable that some errors of fact should be included in any book. A few that have crept into this book are important enough to mention. It is stated (p. 64) that fraternal twins have a more similar genetic identity than siblings, and their higher correlation in intelligence is offered as evidence for the inheritance of intelligence. An unfortunate expression in the description of reciprocal innervation carries the definite implication that inhibitory neural impulses are transmitted to the muscle (p. 200). The receptor for the knee jerk is given as a skin receptor (p. 269). It is impossible to determine why the figure for the incidence of feeblemindedness was changed from 0.3 per cent in the first edition to 2–5 per cent in the present edition, since no definition of feeblemindedness is given. It is clearly stated, apparently in ignorance of Jacobsen's findings, that the only functions that have ever been

localized in the cortex are those directly involving the functioning of definite sensory or definite motor organs in the body (pp. 283, 567). It is denied that age changes in learning and memory are a function of maturation but are rather a matter of the relationship of old and new habits (p. 435), although there is no corresponding denial for intelligence which is defined as the ability to learn more efficient modes of adaptation (p. 342). Certain generalizations are presented without qualification in instances where the evidence is far from adequate. For example it is stated that caffeine is clearly habit-forming (p. 625); that the manic-depressive and the dementia praecox psychoses are psychogenic in causation whereas involutional melancholia is organic (p. 606); and that the inspiration-expiration ratio in breathing records will disclose deception in answering questions.

Most of the points discussed above are concerned principally with the book as a contribution to psychological thought, and are relatively unimportant in evaluating the book as a text for beginning students. The reviewer has selected Dashiell for his own course because it is so rich in experimental factual material. In addition to the numerous tables there are 153 figures, nearly all of which summarize or illustrate the results of an entire experiment. The very complete legends for these figures also serve as an excellent introduction to the methodology of scientific psychology.

The manual which has been prepared to accompany the textbook contains exercises, problems, and questions designed to stimulate review, to start the student thinking about relationships in the material, and to relate the subject matter of psychology to his personal experiences and observations.

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GARRETT, H. E., *Statistics in Psychology and Education.* (Second Edition.) New York: Longmans, Green and Co., 1937. Pp. xiv+493.

Although one fails to discover that "the approach is strikingly different from the first edition," as claimed in the publisher's announcement, it would be difficult to find in psychology or statistics a textbook as thoroughly revised and rewritten as the second edition of Garrett's text. On no occasion has the author been hypnotized by the first product of his pen. Not only have important additions been

made in order to make the text a more complete and representative survey of sophisticated present-day statistical practices, but the explications of the unchanging statistical fundamentals have been rewritten. In most instances the rewriting has involved the elimination of unnecessary and obscurantistic qualifications such as "probably," "perhaps," and "it is thought," and the substitution of unequivocal statements. The net result is a more precise, complete, and integrated presentation of statistical fundamentals.

The approach, as we have indicated, is not greatly different from that in the first edition. The emphasis throughout is on computation and application rather than on derivation, and on the applications to problems of psychological testing, rather than to those of the experimentalist. The one major systematic change is the acceptance and use of the mathematical definition of a score, in place of the "psychological" definition employed in the first edition—a change which contributes in no small amount to the systematic unity, and consequent clarity, of the new edition.

Each of the chapters of the first edition has been rewritten as two or three chapters. This mechanical change has in every case been justified by the addition of an abundance of new material. In Chapter I ("The Frequency Distribution") is found the mathematical definition of a score and the rules for constructing a frequency distribution, together with a definitive treatment of rules and standards of accuracy in the computation and presentation of figures. Chapters II and III treat measures of central tendency and measures of variability, respectively, and these include, in addition to the rewritten account of the fundamentals, a more detailed consideration of difficulties met with in the computation of medians, a discussion of Sheppard's correction for grouping, presentation of the important short method for calculating the σ by guessing the mean at zero, and a useful critical evaluation of the Coefficient of Relative Variability (V).

The next four chapters have to do with the construction and use of cumulative and non-cumulative frequency distributions, particularly the normal probability distribution. In the first of these chapters (IV. "Graphic Methods and Percentiles") are given the methods used in constructing and smoothing frequency polygons and the application of the ogive in the percentile method. The latter is a greatly expanded discussion, covering some 14 pages. In Chapter V ("The Normal Probability Curve") revised discussions of the elementary principles of probability, the tables of frequencies of the normal distribution, the properties of the normal distribution, and

skewness are supplemented by adequate treatments of kurtosis, the Chi-Square Test for "goodness of fit," and a method for constructing a normal curve for any N and σ. The practical applications of the normal curve to problems such as the scaling of test items, the transmutation of measures of relative position into units of amount, and the combination of test scores and distributions occupy Chapters VI ("Applications of the Normal Probability Curve") and VII ("Comparable Measures; Combining Test Scores and Distributions"). In almost every instance the presentation and discussion are more extensive than in the first edition. For example, the construction of the T-Scale is fully described, the description of the transmutation of qualitative data into σ-units is greatly expanded and a useful table of the distance from the Mean, in σ-units, of each single percentage of a normal distribution is presented, and the conversion of scores of different tests into z-scores is described and critically evaluated. Although reference is made to Thurstone's contributions to the statistics of the conversion of judgments of relative merit into σ scale units when the variability of judgments differs from item to item, Garrett describes only the method that applies when no such inconstant variability of judgments occurs.

The chapter on "Sampling and Reliability" (VIII) includes, in addition to the standard formulæ and explanations, new discussions of (a) the formula for the standard error of a median when normality of the distribution is not assumed, (b) the formulæ for estimating the reliability of differences between measures obtained from "matched" groups of subjects, (c) the reliability of percentages, and (d) the reliability of measures of skewness and kurtosis.

The remaining six chapters deal with various aspects of the problem of correlation. Chapters IX and X on "Linear Correlation" and "Regression Equations," respectively, follow the first edition closely except for the addition of an important short method of calculation of r, and discussions of the averaging of r's and of the effect of the "range of talent" on r. The chapter on "The Reliability and Validity of Test Scores" (XI) has as a noteworthy addition a critical discussion of the assumptions underlying corrections for attenuation. The various ways in which the correlation coefficient may be interpreted (verbal, $\sigma_{est.}$, coefficient of alienation, $\sigma_{obt.score}$, common factors, and Ezekiel's Coefficient of Determination) are gathered together and their interrelationships indicated in Chapter XII. "Further Methods of Correlation" (XIII) and "Partial and Multiple Correlation" (XIV) complete the text. Major addi-

tions have been made to the first of these two chapters, through the inclusion of discussions of Bi-Serial and Tetrachoric correlation, the Chi-Square Test (with a reprint of Fisher's table), which supplement the rewritten accounts of rank-order correlation, curvilinear correlation, and the contingency coefficient. Factor analysis is not considered.

The problems at the end of each chapter are well-chosen to reveal the principles discussed. A very helpful feature of the text is the printing of important tables not only in the appropriate chapters but also in a series of " reference tables " at the end of the book.

There can be no question but that Garrett's revised text will find as widespread favor among psychologists and educators as the original text. It is sufficiently comprehensive for a thorough course of instruction in the fundamentals of statistical method, and its lucidity is so uniform that there is very little need for " teaching " the book. In view of this, there is little justification for listing the things that one thinks might well have been included in the text, because they can so easily be given as addenda by the instructor.

Nevertheless, the reviewer regrets Garrett's repeated neglect of the statistical problems and point of view of the experimentalist and his emphasis on the problems and point of view of the psychologist interested in the formal mental tests. In the discussion of the concepts of reliability and validity the traditional operational definitions in terms of standard mental tests are given, and no mention is made of the large and controversial literature on the measurement of the reliability of measurements obtained in learning experiments. Similarly, the discussion of measurement of the reliability of differences between means, etc., is in a world apart from that of the experimentalist whose major problem is that of fitting his experimental methods to the available methods for estimating the chance differences to be expected. Thus, Fisher's extremely useful concepts of " randomization," " the null hypothesis," and " efficient statistics " find no mention, nor is the logical development of his methods for the analysis of variance attempted.* Consequently, the text is not entirely adequate when considered as a handbook for the training of experimental psychologists in the proper use of statistics. The frequency with which " inefficient " and inadequate statistics are reported in the experimental literature lends weight to this criticism.

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* R. A. Fisher, *The Design of Experiments.* Edinburgh: Oliver and Boyd, 1935.

ALLPORT, G. W., *Personality: A Psychological Interpretation.* New York: Henry Holt and Company, 1937. Pp. xiv+588.

Here is a volume on personality that will disappoint the women's clubs and the consulting adjuster. But it will be a mine of instruction for the serious student, and it ought effectually to jar the professional psychologist from his nomothetic slumber. It strikes a plane midway between the complacent generalities of systematic psychology and the personal problems of the consultant. It is a serious endeavor to put the psychology of the individual on a descriptive and scientific plane, within the bounds of the general science, fortified by the latest tools of inquiry, investigation and criticism. This brief summary cannot hope to indicate its wealth of content, and no review can convey its smooth flow, its apt examples, its felicitous expression, its acute analysis, nor the strong and informed conviction that is sustained to the end of the book.

However vigorously the expert may object to some of the convictions (and he will), he will find that the author's argument must be carefully reckoned with, and he will usually find his own objection neatly disposed of in a footnote or a later paragraph. The volume itself is sound evidence of the existence of traits, of their possible consistency and high degree of personal integration. One has all the way through it a distinct feeling that "This is Allport."

The treatment is scholarly, well organized, invitingly put, and when large fields are lightly touched, there is sound discrimination. Only the briefest skeleton of its detailed contents can here be sketched.

Part I deals with "The Approach to Personality." There are 100 pages, in three chapters. The general science of psychology, it is maintained, should extend its horizon to include the "idiographic" along with the "nomothetic" interests, so as to reckon with the unique individual as well as with the laws of mind in the abstract. Various current tendencies in this direction are indicated.

Fifty definitions of personality are critically considered, and the last of these adopted as best serving present needs: "The dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment." Character is personality evaluated, and temperament refers to aspects of chiefly constitutional emotional make-up.

A compact account of the history and development of characterology schemes and theories is given, with indications of the merits and faults of each, and with emphasis on the important development of experimental techniques.

Part II on "The Development of Personality" has 135 pages with five chapters. Here are presented such topics as heredity, personality beginnings, differentiation, integration, maturation, learning, the self, and feelings connected therewith. A significant chapter is entitled "The Transformation of Motives." Here the author gives a detailed defense of his concept of "functional autonomy." Motives and traits are not eternally bound to their origins. They float free from their genetic moorings and become contemporary drives on their own account. Organized and unified with other autonomous drives they give a personal unity that is not revealed by genetic accounts of their initial manifestation. They contain a personal dynamic core of meaning, often concealed by a variety of "equivalences" of stimuli and of acts.

This concept of the functional autonomy of dispositions is the minor obstacle, and the chapter on "Transformation" is the middle of the third act in which, according to certain dramatic conventions, the minor obstacle should be removed. If personal attributes can be examined or inferred at their contemporary face value, without being traced to origins or reduced to elements, instincts, habits; if the stimulus can be "dethroned" and the "fetish of the genetic method" removed, the way is then clear for a study of the unique individual in his present structure and pattern, each being in some respects a law unto himself.

This "declaration of independence" is staunchly defended by the author. It should be accepted with caution, for in less competent hands it can easily become a declaration of indifference. There is always the chance that the distinction between genotype and phenotype rests on an obscure vision of the latter.

The principle of functional autonomy accepted, the major obstacle then looms in sight. Namely, what precisely are the "dispositions" that are organized, structured, dynamically interwoven in the individual? What exactly is it that becomes autonomous? Part III, therefore, in 130 pages with five chapters, undertakes the survey of "The Structure of Personality." It contains astute chapters on the concept of elements, identical and otherwise, and advocates the "dynamic trait" concept already associated with the author's name.

Factor analysis and the theory of specific habits are found not to serve the idiographic purposes of the psychology of personality, and personal "equivalence" must take the place of identity, both of the occasion and of the act. To the reviewer this Part III is the most provocative section of the book.

The trait theory is introduced and defended with great skill. The trait is " a generalized and focalized neuropsychic system (peculiar to the individual) with the capacity to render many stimuli functionally equivalent and to initiate and guide consistent (equivalent) forms of adaptive and expressive behavior."

The traits are inferred biophysical entities, best named by the blanket terms originating in common speech; an analysis of such trait names, with various classifications of them, is given, with samples. The trait is also essentially a " form of readiness " and " Traits exist in exactly the same sense in which any mental disposition or readiness-for-response exists."

But this is the real crux. For in exactly what way *does* a " readiness " *exist*? Say, the readiness of wood to burn, or split, or float or sprout, or what not? The theory of traits might profitably consider the theory of attributes in general, that is, outside the field of personality. It is possible that a " readiness " is always an unwitting response to a persisting irritant that is not easily identified but is not therefore " dethroned."

Cogent sections are devoted to the elaboration of the trait concept, the varieties of traits, and their distribution, and special emphasis is laid on the distinction between abstract, " common " traits, which may perhaps be scaled, and " individual " traits, the latter being the most neglected. They are particularly revealed in the individual " style " of behavior. Traits vary in scope, consistency, and independence. But they are always concrete and personal in their organization, contemporaneous and perhaps autonomous; their generalization is on the basis of equivalence and their meaning is derived not merely from their history but also from their rôle in the individual life struggle. The names we give them are only blanket terms, designating a certain range.

According to the author the hypothesis of traits best accounts for whatever degree of unity and consistency is exhibited in the behavior stream. The reviewer believes that it is these latter that, instead, account for the trait hypothesis.

The last chapter of this section on " The Unity of Personality " seems to be further off the ground than the others, and serves to show what crude metaphors and diagrams can do with personality elements described as " inferred readinesses." The reader begins to feel their ghostly quality; indeed, the traits themselves begin to possess an array of traits, however much the author seeks to avoid it. It is one thing to use common sense names as adjectives, applicable

to a person's conduct, and quite another thing to use them as the names of inferred biophysical entities. The "hormic" psychology has tried this, with results that are well known.

Part IV on "The Analysis of Personality" has 130 pages with four chapters. It gives a survey in some detail of the numerous procedures that have been advocated for diagnosing, measuring, and representing personal make-up. Various records, tests, ratings, experiments, case methods, statistical and graphic devices, are here critically considered and evaluated. There is also a chapter on style or consistency in expressive behavior. The psychology of personality is to take advantage of whatever merits these varied approaches have, and no one alone is adequate.

The emphasis throughout is on the importance of the dynamic synthesis of traits in the individual, but no very clear way of appraising this dynamic synthesis is described. A selection of "common" traits for psychographic portrayal is given. Even in the best of hands such a selection of items is more or less arbitrary. Allport's account of the traits he chooses to elect is full of valuable comment and criticism, and a list of many other traits proposed by others concludes this chapter.

A special chapter deals with principles and results of ratings, tests, and experiments. Preference is expressed for observation on the "molar" level "where the structured forms of personal organization" are more apparent. The chapter on expressive behavior, with its discussion of style as a high level trait has many interesting and original suggestions.

Part V on "Understanding Personality" is inevitably a short section, in the light of the precarious state of the psychology of the subject. There are 70 pages with three chapters. One chapter discusses the ability to judge people, and makes good use of the many empirical studies on this topic. In another chapter inference and intuition are contrasted. Both are needed. The author welcomes, however, the "totalitarian" trend of recent discussions of perception and believes that such a reversion is now due in the psychology of personality.

The final chapter is on "The Person in Psychology." The "personalistic" systems of psychology are expounded, Stern being featured. This viewpoint with "its shafts heavily supplied with metaphysical barbs" is set over against the psychology of personality as portrayed in this book, its weapon being "empirical necessity." Both developments agree in insisting that the unique individual be

given more attention by the science of psychology. A brief review is then given of the main principles advocated throughout the book. There are adequate indices of subjects and of names.

The general tone of the book is in the main dispassionate, eclectic and prospective. The "intuitive" reader will discern a few pet aversions and addictions, but on the whole there is a certain timelessness in its subject matter, point of view, and organization, that will give it a much longer than average life. And it will be an influential one.

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Barnard College, Columbia University.

STAGNER, Ross, *Psychology of Personality*. New York: McGraw-Hill Book Company, Inc., 1937. Pp. xi+465.

The recent appearance of two books * written by academic psychologists and devoted to the subject of personality indicates that this new field finally has a respectable house of its own on a main thoroughfare of psychology, and that students will no longer have to traverse the back alleys of psychoanalysis, social work, statistics, endocrinology, or mental hygiene to gather information and moral support in their search for knowledge regarding that most neglected of all subject-matters in psychology—the normal person. Dr. Stagner's book is, therefore, of more than usual interest, since it is one of the pioneer attempts, in this country, to conceptualize a new area of legitimate psychological interest.

The first few chapters review the various methodologies available for the study of personality. These are followed by an account of the constituents of personality and a search for the particular frame of reference or level of description most meaningful to psychologists as such. The level chosen is that of the trait which is, for the author, "a generalized response-integration." The third division of the book is devoted to the dynamics of personality, including complete accounts of Freud, Lewin, and Adler, and ending with a theory similar to that of derived drives and stressing the cultural determination of motives. A final section deals with the variety of forces—biological, familial, recreational, educational, economic—affecting the consistent pattern of integration which is personality.

* The other book referred to is G. W. Allport's *Personality: A Psychological Interpretation*. New York: Henry Holt and Company, 1937. Pp. xiv+588.

The book may be regarded as a text or as a systematic treatise. It is clear that the author had the student chiefly in mind, and as a text the book has much to recommend it. It is rich with appropriate examples and case histories; it stresses constantly the relativity of cultures and the dangers of community-centrism for the scholar who pretends to be objective; it describes the techniques and results of many pertinent investigations; its more practical and normative chapters thoroughly examine and reject the common presupposition that the emphasis in problems of personality adjustment should be to make the person fit the particular social environment that surrounds him.

One of the book's weaknesses as a text is the atomistic nature of its approach, with definitions and mechanisms discussed and occasionally left hanging in mid-air so that the concrete personality emerges somewhat infrequently. At times, problems are not seen as problems and much is taken for granted—*e.g.* factor analysis is discussed without any examination of its assumptions or techniques. And after reading the book and noting the references, the student would not realize that the study of personality has been seriously pursued by many scholars living prior to the twentieth century outside the American culture pattern.

Since the polar concept in the volume is that of *trait*, the term as used by Stagner must be examined. Traits are " higher order habits or patterns generalized out of specific experiences of personality." As such, they are abstractions implied or inferred from the many specific activities or " indicators " observable in the single individual. The inference is clear that all traits are acquired. And because traits are products of the environment they are comparatively limited, varying only on the two dimensions of (1) withdrawal and approach and (2) intensity of activity. We should, then, expect to find the author suggesting that there are certain common " major " traits: emotional sensitivity, self-confidence, and sociability.

In applying behaviorism to the concept of traits, the author has obscured what many others in the field regard as the most characteristic and perplexing aspect of personality, namely, its uniqueness. How is this salient feature of every human adult to be accounted for if all traits are acquired? The author's answer is that " we may expect trends of integration and differentiation of response to continue from birth to the grave." The determinants of these " trends " we later find are at least in part biological, while in the final chapter it is suggested that conditions of a " non-cultural sort " are probably responsible for half of personality structure. The behaviorist search-

ing for uniformity and finding uniqueness finally bows to common sense.

Other crucial concepts are those of "attitude" and "value." The latter is considered to be a generalization of attitudes. Here again the emphasis on integration leads to an over-simplification of the processes involved. The possibilities that most cultural values first lie outside the individual and become introcepted in toto as personal values is precluded in the author's account. Yet much of his own evidence concerning the influence of family and class points to this interpretation.

The theory of motivation outlined is that of a system of tensions attached to particular situations due to cultural influence. As the author points out, this system has the advantages of abolishing tautologies, avoiding simple generalizations, and stressing the autonomy of present drives. But we are left wondering how these drives are related to traits, attitudes, and values. Are any of these latter dynamic or are they always merely directing? This isolation of concepts reflects both the immaturity of the field of personality and the inadequacy of the author's systematic approach. One may be eclectic about facts, but not about theories. However, that an approach to personality *has* been attempted and that the approach is so definitely of a *psychological* nature is almost excuse enough for a certain methodological looseness.

HADLEY CANTRIL.

Princeton University.

MURPHY, LOIS BARCLAY, *Social Behavior and Child Personality: An Exploratory Study of Some Roots of Sympathy.* New York: Columbia University Press, 1937. Pp. lx+344.

The broad inclusive title of this publication is not misleading. Dr. Murphy has admirably succeeded in her undertaking which was ". . . not to secure a definite answer to one or two specific and narrow questions about well known points, but rather an excursion into inadequately known areas where tentative hypotheses and trail-markings may help the next investigator, and where no item of information is to be scorned" (p. 13).

The brief introduction of twenty pages reports the few previous studies of sympathy and discusses the aim, methods, and sources of data of the present study, the focal point of which is "the analysis of children's responses to distress situations in other children." In

keeping with the exploratory point of view the sources of data were diverse: data were obtained by the diary record method on five groups of preschool children from varied environments; ratings on an inventory of social behavior were made by both nursery school teachers and by trained observers; the behavior of 34 children in from 6 to 10 experimental situations was recorded; one-hour parent interviews were held for 34 cases; parents' day-by-day records for from 6 months to 1 year were kept for 6 children; and finally case records as well as data from other social studies were available for many of the children of the study. The method of analyzing the data was both quantitative and qualitative.

Following the introduction, Part One is devoted to a survey of the conflict between sympathy and aggression in the world today. Dr. Murphy vividly and tellingly pictures the " widespread exploitation and slaughter, along with institutionalized compassion " in the world of adults as well as the " competition and conflict . . . mixed with friendliness and coöperation " in the nursery school of three-year-olds. Regarding the general cultural setting of the children she studied, the author states, " . . . we are struck by the *physical and external similarities* and the *internal and mental conflicts.*"

It is within this setting that the data of the study are presented in Part Two. The varieties of sympathetic and unsympathetic behavior are first described realistically by records of actual instances. These illustrations are followed by tabulations of sympathy stimuli and of their responses. The individual sympathy responses are then related, by means of charts and protocols, to the behavior of other individuals, to the group as a whole, to age, to other social behavior such as aggression, and to the child's feelings of security. The liberal use of illustrative protocols is continued in the chapter reporting the behavior observed in framed situations. It is in this section particularly that the complexity of the motivating forces arousing sympathetic or non-sympathetic behavior is most forcibly presented. Each of the five chapters in Part Two is concluded with a summary which aids in preserving unity in a discourse which is most detailed and diverting and at the same time comprehensive.

Part Three, *Synthesis and Interpretation*, comprises one-third of the book. Its first chapter, " Sympathetic Behavior and the Total Personality," succeeds in amalgamating the seemingly contradictory results of statistical study, which indicate a certain stability of an individual child's sympathy behavior scores, and the data which show

great individual variation. The case method is succinctly used to explain how and why individuals vary from situation to situation and from time to time in the degree and manner of their sympathetic expression. It is clearly and convincingly demonstrated that the nature of sympathetic behavior can be understood only when studied in relation to the child's culture, his dynamic tendencies, and the meaning which any particular situation holds for him as an individual. On this basis the author has been tempted to put forth a theory of personality in general, and to discuss the part played by culture in shaping behavior.

In the last chapter (IX), "The Theory of the Development of Sympathy," Dr. Murphy traces the changing expressions of sympathy from those of the four-months-old infant to those of the six-year-old child. She explains the transitions by varied psychological theories such as conditioning, imitation, trial and error learning, redintegration, egocentricity, and Gestaltism.

The appendix gives in full the social behavior scale developed and used in the study. About forty references and an index conclude the book.

Dr. Murphy has combined an unusually broad survey with a specific and detailed study in such a way that one complements and reinforces the other. The monograph is an excellent illustration of the importance of approaching a poorly understood phenomenon in an exploratory but scientific fashion. Prematurely to restrict an investigation produces scientific mental sets which too often take years to break down whereas a well planned survey is a starting point for fruitful detailed research which develops consistent meaning from otherwise apparently contradictory facts. It is clear, for instance, that in this study, conclusions drawn from the experimental situations alone would undoubtedly have led to the erroneous specific conclusion that certain children were unsympathetic and also to a faulty explanation of sympathetic responses in general. However, when the same data are viewed in relation to facts from other sources, more acceptable conclusions are evolved.

The exploratory method, however, is valueless unless the investigator has the ability to absorb the facts and to relate them to one another. The process is by no means automatic; it requires a high degree of judgment and insight, both in planning the procedures so that the facts can be profitably related, and in finally absorbing the meaning from the data.

The book abounds in explicit and implied suggestions for further

research. There is significance for other social studies in the fact that laboratory methods have proved valuable in the study of such a completely social trait as sympathy but it is also significant that interpretations of behavior in such situations must be studied in terms of meanings for the subject.

Although there are several instances of carelessness such as referring to a frontispiece which has been inserted elsewhere, omitting references, and other minor errors, and although there is some randomness of exposition, the general construction of the book and its important message definitely outweigh its faults.

The book is heartily recommended not only to students of social behavior but to all investigators of child psychology as a refreshing antidote to the narrow delimited researches of recent years.

HELEN THOMPSON.

Yale University.

MURPHY, GARDNER, MURPHY, LOIS BARCLAY, and NEWCOMB, THEODORE M., *Experimental Social Psychology.* (Revised Edition.) New York: Harper and Brothers, 1937. Pp. xi+1121.

The purely mechanical differences between this new edition and that of 1931 are noteworthy. There are over four hundred additional pages and each page now contains about ten per cent more print. Experimental results have been condensed into tables which easily reveal the trend of research on selected topics. Footnotes at the conclusion of each chapter have been replaced by references to chapter, page, paragraph, and line at the end of the book. Marginal guides have been eliminated. A bibliography of 1,111 titles has been assembled. Apparently almost every paragraph has been rewritten, although the general arrangement of both editions is almost the same.

It is impossible to inhibit the urge to express appreciation to the authors for accomplishing this synthetic compilation. Obviously someone has to set himself atop a swivel chair and observe what social psychologists are doing in and outside of their laboratories, if research is to progress and if teaching is to be communicative. The guild should be grateful that three extremely competent people are willing to sacrifice a portion of their own research time for the scientific and social good.

Six years have elapsed since the first edition appeared and necessarily the quantitative output of research has increased. Indeed the

course of social psychology conforms to the usual trend of an ever accelerated accumulation of new or different materials. During these particular years, moreover, grave social events have been occurring which have had some effect upon every academic discipline.

It seems sensible at this point, in an effort to evaluate the present volume, to quote the reactions of Mark A. May to the first edition:

> "Perhaps the most outstanding impression which this book leaves with the reader is the spotty nature of the experimental data in social psychology. It is literally strewn with odds and ends of experiments, with here and there a larger piece of work extending over a period of years. Another striking fact is that so few experiments are repeated by other investigators. That which is so common in the physical sciences rarely happens in the social sciences. The result is an increasing accumulation of unverified data. The authors of this book have done well to call attention to the gaps in the data as well as to their inconclusive nature." *

At first glance this particular reviewer feels that social psychology has not been able to meet these important criticisms during a relatively short interval of time. In spite of the organizing schemes of the authors he has the impression that research is still "spotty" and uncoördinated; and using this edition as a text for undergraduates, as it can be in its new form, has offered confirmation by revealing significant "gaps" in knowledge and the concentration of research upon topics which possess a conventionalized methodology.

And yet the social psychology which the authors selectively reflect can also be said to have undergone change. Any additional work, after all, is bound to contribute a little more than another title for the author's bibliography; thus more is known now concerning the content and perhaps the interrelations of political or economic attitudes than formerly, and the earlier responses of children are better charted. There can be no doubt that the inflation of research in social psychology has produced supplementary or novel "facts" and that, therefore, the subject is richer in anecdotes and scattered theories.

The authors, furthermore, have added a subtitle to the book which aids them considerably in choosing and presenting their data: *An Interpretation of Research upon the Socialization of the Individual.* Here at least is a central topic for investigation and unification far superior to the authors' bland 1931 formula of studying "individuals in their interaction when the analysis of impersonal stimuli and the fact of historical determination are not matters of primary concern." This new orientation, which has become a popular

* PSYCHOL. BULL., 1933, **30**, 778.

meeting place for so many social scientists under the banner of "culture and personality," epitomizes two trends: the need which social psychologists have felt during the depression for relating their work to a live, social context; and the growing, rather desperate concern within all sciences, especially the so-called social ones, for breaking down the artificial boundary lines between related disciplines. There was some emphasis upon the contributions of sociology and anthropology in the first edition, but the authors apparently felt conscientiously obliged to confine themselves within the limits of that awe-inspiring adjective, "experimental," in their title. Now they have torn themselves away from this dogmatic restraint in statement of principles and in practice, and their volume, as a result, is richer and more suggestive. In 1931, for example, they did indicate both in the title of their third part and in context that work on "the individual in the group situation" and "the coöperating group" had been carried on "in our own society"; this time one chapter on "some adult behavior patterns in our own society" includes a long, relevant discussion of "competition and coöperation in the light of ethnological material." The Murphys and Newcomb have achieved, indeed, *throughout* their book the "change in perspective" which they announce in the very first chapter.

Instead of continuing such a shower of genuine praise, this reviewer prefers to leap forward another six years or so when, it is hoped, a third edition of *Experimental Social Psychology* will appear. If the writers continue their present way of approach to their material, they will be frustrated, it is sadly feared, by at least three significant difficulties. In the first place, the quantity of experiments will be still greater and hence the task of selection will be even more arduous. A much longer volume will gradually approach the nature of the *Psychological Abstracts* or a cumbersome unorganized sourcebook.

There is, secondly, a strong and laudatory tendency in the present book to embrace many of the most significant problems of *general* psychology. For to deal "with the processes of growing into and functioning in our own society," the authors, like most writers of textbooks in social psychology, have included topics such as motivation, learning, perception, and personality. The next edition, then, will have to incorporate still more of social psychology into just plain psychology. Whatever principles there are or can be discovered in human behavior can be said to operate in the same fashion either in the laboratory or in life; the variables are usually identical; only their values change from situation to situation. The unique contri-

butions of social psychology must be its use of sociological and anthropological materials for the purpose of assigning different weights to its variables in different situations and different cultures *and* its ever repeated warning that laboratory formulæ should be pointed toward society.

If research piles up and if social psychology becomes still more definitely an application of general psychology, then the authors will have either to issue their book in from two to six volumes, or else abandon the deplorable, defeatist attitude they now display toward laws and principles. "We are indeed eager to find such laws, but we doubt whether our generation will live to see them established." Maybe so, but dodging the responsibility and discouraging others in this fashion is really dangerous and almost anti-scientific; for, as a matter of fact, it appears that the significant advances made in this edition, like the chapter on attitudes, are a function of new, if speculative, theories and hypotheses on isolated topics. Facts cannot be gathered for decades by mentally indolent men and women (who, nevertheless, to quote the writers again, settle down "to the hard work of discovering the particularized facts upon which the laws must be based") if social psychology and general psychology and sociology and anthropology are ever to become real sciences and interrelated. Obviously, as every sophomore is able to repeat on an examination, fact-finding and theory-building must occur simultaneously. It is correct to assert that "attempts to *formulate* social laws have for the most part been hasty or inept, or both," even though, for example, a consideration of the implications of Freud, Marx, and Sumner might have been better for illustrative purposes than Duprat, Tarde, and Ross. It is, in addition, certainly wise to describe a few not very staggering peculiarities of social science due to the presence of individual and cultural differences. The authors themselves, however, will have to be a little less reluctant than they are at present about the possibility of formulating "true laws regarding the socialization of individual human beings" if their third edition is to be as great an improvement over this one as the latter is over its predecessor. By refusing to seek more general postulates about particulars (yes, the word is *particulars*), they may drown themselves in data or convince themselves that the goal of social science is to publish an encyclopedia based on conventional, alphabetically arranged rubrics.

LEONARD W. DOOB.

Yale University.

HINSIE, LELAND E., *Concepts and Problems of Psychotherapy.* New York: Columbia University Press, 1937. Pp. xv+199.

This book is intended to be a preface to psychotherapy, presenting the general principles and serving as a guide to those lacking training in psychotherapy. About half of the text (81 pp.) is turned over to a chapter on the fundamental concepts of psychoanalysis; a chapter on Meyer's psychobiological "attitude" covers 39 pages; the remaining fourth of the book consists of four chapters: an introduction and a conclusion, a chapter on Jung and Adler (12 pp.), and a statistical evaluation of psychotherapeutic methods based on figures from three psychiatric institutions and from New York state and the United States at large written by C. Landis. The appended bibliography contains 217 titles, three-fourths of which are in English.

The presentation of psychoanalysis is predominantly analogical and not likely to excite sympathy in the educated reader who is unread in psychoanalysis. The fundamental concepts of this body of knowledge had better have been introduced at their face value than in the context of a river (emotion) springing from two subterranean lakes, merging with a maternal and a paternal stream, flowing on into the lake of the super-ego thence through locks into the ego and on to the ego-ideal and reality. Psychoanalysis is given credit for contributing the backbone of the concepts of psychotherapy, and its weaknesses as a research program are placed before the reader.

The rest of the book is somewhat a contrast to the mythical treatment of psychoanalysis. It is essentially a plea for application of biometric methods in the field of psychotherapy. Meyer's psychobiology is offered as the suitable program for research. Landis' chapter is an illustration of the necessary type of research.

At disparate points in the text the writer arbitrarily throws in estimates of the applicability of different psychotherapeutic methods to various clinical syndromes. The only attempt to present evidence is Landis' tables. No real attempt is made to describe the methods themselves. The apt references made to worthy sources for further reading plus the stress on scientific research are the two things which make the little book a guide in the usual sense of the word.

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HIRSCH, NATHANIEL D. M., *Dynamic Causes of Juvenile Crime.* Cambridge, Massachusetts: Sci-Art Publishers, 1937. Pp. 250.

Hirsch, formerly director of the Wayne County Clinic for Juvenile Delinquency, in this volume records data secured as a clinical

psychologist for more than five years. Approximately half of the pages are spent in presenting eight interesting, detailed, well-written, neo-Freudian individual case reports. The responsibility of those reports is divided in each case between a social worker, a psychologist, and a psychiatrist, each one anonymous. The claims of treatment in the individual cases are modest.

On the basis of the title, it would be assumed that the analysis of causal factors represents the intended contribution. The procedure used in determining the causal factors is defended in advance by Hirsch's statement: "The 'social sciences' can be scientific in spirit without being either 'exact,' strictly empirical, or quantitative" (p. 31). To many of us, "scientific in spirit" means "vaguely scientific."

The procedure in causal analysis was as follows: Six hundred and four court cases of juvenile delinquents (90% were recidivists) were analyzed independently by three psychologists, Miss Margaret Ives, Miss Sybil Stone, and Nathaniel D. Hirsch. Each had a list of 43 possible causes classified as hereditary, 25 possible causes classified as environmental, and 7 possible causes classified as accidental. From these lists, each one chose no more than four and not less than one for a single court-case delinquent. Ten points were given for each delinquent, divided according to a prearranged method depending on the number of causal factors chosen. The ratings of the three psychologists showed unusual consistency, although their personal theories were divergent.

Percentages of the total number of points (6,040) were computed and averaged from the data of the three raters for each possible cause. On the basis of these percentages Hirsch lists (p. 238) the following as major causes of juvenile delinquency: defective intelligence (22.5%); instability (5.8%); hypersuggestibility (6%); immaturity (5.3%); psychopathic personality (2.2%); constitutional inferiority (2%); ego-centric, hyperaggressive, and quasi-paranoid personality (1.8%); emotional conflicts (3.8%); inferiority complexes (2.4%); endocrine dysbalance (2%); and home conditions (20%). Although "neighborhood" received 5.8% of the total points as a causal factor, it does not appear in the summarizing list of major causes (p. 238), and "home conditions" with 20% are alluded to as questionable.

By these methods, and adding together all the percentages of the possible hereditary causes, 59.8% of juvenile delinquency is attributed to heredity. By a similar procedure, environmental causes account for 38.9%, and accidental causes for 1.3%. These figures are similar

to the percentages a reader can discover in the three lists of possible causes, which were subjectively determined in advance in a preliminary study of 200 cases by Hirsch alone, and from which the ratings were made. The number of possible hereditary causes given the raters was 43 out of a total of 75, or 57.3%. The possible environmental causes were 33.3% of all possible causes and accidental possibles were 9.3%. Comparing, 57.3% of possible causes given the raters were classified as hereditary, and after the ratings were made, 59.8% of delinquency was found to be due to hereditary causes. Before these results of the relative contributions of heredity and environment can be accepted, many of us will have to be convinced that the ratings and their percentages were not influenced by the relative number of possible causes from which to choose under the headings of hereditary, environmental, and accidental.

The arbitrariness of the heredity-environmental classification (recognized on p. 39) is evident from the listing of inverts, general instability and hypersuggestibility on the hereditary side and perverts, instability of adolescence, and neurasthenia on the environmental side. The classification disregards Hirsch's prior recognition of the fact (p. 11) that relative contributions of heredity and environment vary with the particular characteristics measured. Each of the items listed under heredity, for example, presents its own heredity-environment problem.

In Chapter I, "Causal Categories," Hirsch lists four strange bedfellows: hereditary causation, environmental causation, accidental causation, and genius. Hirsch's exposition of eight "facts and situations" under which the relative contributions of heredity and environment vary, is an excellent summary of current thought in the field. His position that the "*environment* of an individual, family, class, natio-race or race, is, on the whole and in the long run, an expression of its innate capacities" (p. 13) is worthy of careful reading and consideration.

A reader probably will have difficulty in understanding what is meant by environment, accidental causation, and genius. In ordinary usage in psychology today, environment refers to all external forces acting on an organism. Hirsch limits the concept of environment to social stimuli: family, school, neighborhood, church, club, and vocational or professional surroundings. This leaves room for accidental causation, which refers to stimulation by droughts, earthquakes, diseases, automobile accidents, death of parents. There are two difficulties in classifying these "accidental" stimuli as non-environ-

mental: (1) the students of biological and social sciences will misunderstand each other when using the concept of "environment," and (2) both hereditary factors and social stimuli are by implication classified as non-accidental. Thus the classification raises a bigger problem than it attempts to solve.

The concept of genius as a causal category in the social sciences is based upon the assumption that "the spirit of a community is generated on the whole by the deeds and thoughts of its most talented and gifted men, dead or living" (p. 22) and "Genius is the most important *single* cause of history . . ." (p. 22). Assuming this to be true (which may be difficult), can genius be isolated as a causal category separate from heredity and environment? It leads one into a circular argument. Are men of genius themselves a product of heredity and environment, and as such do they give a devious route by which heredity and environment interact on themselves? As far as a single individual is concerned, we can consider that men of genius influence in part the form in which environmental forces impinge on an organism.

Statistical treatment is elementary. Correlations are needed for such statements as, "We discovered, as a rule, that defective intelligence was closely associated with hypersuggestibility, etc., hypersuggestibility with general emotional immaturity, etc. . . ." (p. 56). The only evidence bearing on such statements is the percentage values of causes, where it is theoretically possible that defective intelligence with 22.5% of the total delinquency points can be highly correlated with hypersuggestibility with 6% or immaturity with 5.3%. Also, the answer may be hidden in the "etc.".

Table V (p. 59—there is another and different Table V on p. 54) compares the importance of "mental and personality deviations among juvenile delinquents and the general population." It includes a comparison of Hirsch's data with that of Healy, the Gluecks, Burt, and others, with a close correspondence. Fifteen per cent of Hirsch's court-case delinquents were feebleminded, which when compared to 1 to 1.5% of the general population, gives a ratio of 10–15 to 1. Similar comparisons are made for psychopathic personality, endocrine disturbance, unstable and hyperaggressive, hypersuggestible and emotional, and constitutional inferior.

That raises the all-important question of a control group, which is an integral part of "the scientific spirit." Hirsch, not unlike so many investigators in the field of crime, has no comparable control groups of his own, deplores the fact that he has none, but draws conclusions

by estimating what control groups probably would show, or by relying on Burt's data. It should be unnecessary to say that the problem of juvenile delinquency causes will remain speculative until adequate control groups are adequately studied under the same conditions and by the same experimenters as the experimental group. The most thorough, quantitative study of court-case delinquents describes the characteristics of the group studied, and no more. Even if those characteristics are not the same as those of the population as a whole, they may be the same as those of juveniles as a whole, juveniles of certain races, or non-delinquent siblings, if the same thorough, quantitative study were made. Unfortunately, it is difficult to secure adequate control data on such characteristics as "unstable and hyperaggressive" and "hypersuggestible and emotional" on a comparable basis. Institutionalized individuals, more readily than non-institutionalized, can be placed in situations where sufficient time is available and attitudes can be built to reveal hidden "bad" characteristics. Students of juvenile delinquency know these things full well, but it is to be deplored that many of them plunge into generalizations about causes of juvenile delinquency from characteristics of a single group under certain conditions of study.

The same care in drawing conclusions is necessary when one jumps from the assumption that court-case delinquents are representative of all juvenile delinquents, or that convicts are representative of all criminals. It has been mentioned by others many times that defective intelligence may not be a general cause of juvenile crime but rather a cause of getting caught. Another element may enter into the situation. Hirsch shows that larceny accounts for 55.9% of the delinquency in his group. We have no idea as to how many juvenile delinquents are caught but not turned over to the authorities; or if turned over to the authorities, we do not know how many of their cases are settled by parents before they reach the courts. Court-case delinquency may be a matter of characteristics of the offended. One such characteristic could be a willingness to take the time to appear in court against the offender. A study of "complainant areas" in relation to "delinquency areas" would be revealing.

In Chapter V, "Broken and Unbroken Homes," Hirsch makes a valuable distinction by dividing broken homes into two classes: (A) normal homes, broken by such a factor as death of one or both parents, and (B) abnormal homes, broken by such a factor as divorce. His data show (p. 238) that "less than 20% of the parents of all

delinquents are 'normal'; in Unbroken Homes only 27% are 'normal'; in Broken Homes A 24.8% of both parents are 'normal'; in Broken Homes B only 1.56% of both parents are 'normal'." ". . . it is discovered that only 22% of the siblings of juvenile delinquents are delinquent." He asks the question "If the Broken Home and the sordid milieu are major factors in the causation of the delinquent siblings, how account for the non-delinquent of 78% of the siblings?" (p. 238). Since Hirsch holds that "unfavorable surroundings in general are in large part a result of the poor constitutional make-up of the parent or parents" (p. 238), he accounts for the 78% non-delinquent siblings by the assumption that they do not have poor constitutions like their parents. One is impelled to ask, what would happen if defective intelligence were put to an analogous test? What percentage of the siblings of juvenile court-case delinquents are feebleminded, hypersuggestible, and emotionally immature? Can we account for them similarly?

In Chapter VIII, he expands the theory that defective intelligence when "coupled with personality and emotional deviations" (p. 239), is important in production of juvenile delinquency. In addition, he shows that delinquents have good average mechanical ability. (He assumes that there is such a general ability.) In Chapter XII, an excellent summary, he suggests that the public schools should "train the mechanical talents of from 40 to 45% of its children" (p. 239).

The book closes on a pessimistic note of conditions in the world today, which, if improved by men of genius, would go far in preventing juvenile delinquency.

By this time, probably both the author and the publishers have noted that a more careful proof-reading would have been desirable.

MILTON METFESSEL.

The University of Southern California.

GESELL, ARNOLD, and ILG, FRANCES L., *Feeding Behavior of Infants: A Pediatric Approach to the Mental Hygiene of Early Life.* Philadelphia: J. B. Lippincott Co., 1937. Pp. ix+201.

This well-illustrated volume (it contains two hundred photographs and illustrations) is divided into three parts: Part I, *The Behavior Aspects of Nutrition,* Part II, *The Growth of Feeding Behavior,* and Part III, *The Regulation of Feeding Behavior.* An accompanying appendix gives several illustrative biographies of feeding behavior. The book was prepared with the physician and child hygiene nurse particularly in mind.

In content and point of view Parts I and II resemble previous publications by the senior author, with discussion of the normative development of "the child" at successive age points and with little attention to individual differences in sequences or rates of growth. Many of the illustrations were taken from *An Atlas of Infant Behavior*. Part III, however, stresses the importance of individualization in infant feeding and introduces the mental hygiene concepts.

The authors recommend, on the basis of actual clinical practice, allowing the infant to set up his own schedule of feeding and sleeping on a "self-demand" basis. They state that nutrition, sleep, and other activities of the infant are interdependent and fluctuate by virtue of interaction rather than randomly. When infants are put on clock-hour schedules rather than "self-demand" schedules, feelings of anxiety and insecurity are claimed to be generated.

> "If the constitutional indicators are ignored in the interests of an inflexible schedule, there ensues a contest between infant and adult. The contest is waged with unnecessary losses and emotional disturbances on both sides. Superficially it might appear that the self-demand schedule would encourage whims and instability in the child. Exactly the opposite is true. For by individualization of feeding the infant is most directly and most completely satisfied. He is satisfied vegetatively and emotionally. He escapes periods of want, anxiety, and distress. The promptness and the certainty of satisfaction cumulatively experienced—there are over 2,000 feedings in the course of the first year—will nourish that sense of security which is essential to mental health. (Pp. 106–107.)

Again, "The individualization of food-sleep schedules, therefore, proves to be a basic approach to the mental hygiene of infancy" (p. 134). "The infant's sense of security, therefore, depends primarily on being well fed. The term *well fed* applies in two ways. It may refer to his state of nourishment or to the manner in which he is fed" (p. 133).

Just what criteria enter into the judgment of infant security, insecurity, or anxiety is not clear to the reviewer. Neither is any evidence presented to show that children who as infants were brought up on a self-demand schedule are emotionally more or less stable than other children reared on a clock-hour scheme.

The authors are of the opinion that the problem of weaning "has been invested with undue proportions and has been subjected to unwarranted generalizations in psycho-analytic literature. Weaning, at least under modern conditions of child care, is not necessarily a traumatic event. Nor is it to be uniformly regarded as an emotional readjustment which involves the 'pleasure principle.' . . . And

often enough the infant's preferences in a period of transition are in a direction opposite from that which the pleasure principle logically demands" (p. 117).

BETH L. WELLMAN.

University of Iowa.

GARTLAND, RUTH M., *Psychiatric Social Service in a Children's Hospital: Two Years of Service in Bobs Roberts Memorial Hospital for Children, University of Chicago Clinics.* Chicago: University of Chicago Press, 1937. Pp. viii+105.

Psychiatric social service to children at the Bobs Roberts Hospital of the University of Chicago Clinics is described and discussed. The description includes a statistical study of cases referred and treated, a statement of the concerns of patients as expressed to the pediatrician and as expressed to the social worker, and a statement of services rendered. Consideration is given to means of integrating the services of pediatrician, psychiatrist, neurologist, and social worker.

Several pages are devoted to a case illustration showing changing treatment trends. Among recent trends the following are stressed as being important: (1) Search for the client's real wants and development of a plan to meet these wants rather than satisfying the worker's need to treat the causes of problems. (2) Emphasis on treatment rather than on study and diagnosis. This means abandoning the long social histories formerly taken in favor of shorter more diagnostic ones. (3) Focus on helping persons with their real concerns instead of on protecting the community from problem people. These trends may be summed up in a philosophy which is individual centered rather than profit centered.

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COIGNARD, JOHN, *The Spectacle of a Man.* New York: Jefferson House, 1937. Pp. 252.

Dr. Coignard's *The Spectacle of a Man* shows Freudian psychotherapy at work, and makes clear the best Freudian view of character and life. To that extent the book seems valuable, both for the general psychologist and for the layman. Unfortunately for the layman, the book suggests that the woman in the case represents a particular

college; it implies dogmatically that intellectual complements should never marry; and, what is more important, it fails to suggest that the man is the particular type to which the Freudian concepts can be applied, and that even as applied to him those concepts need translation into more scientific language.

W. S. TAYLOR.

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BOOKS RECEIVED

BOWDEN, A. O., and MELBO, I. R., *Social Psychology of Education: Applications of Social Psychology to Educational Problems.* New York: McGraw-Hill Book Company, Inc., 1937. Pp. xv+296.

JOUSSAIN, A., *Psychologie des masses.* Paris: Ernest Flammarion, 22 Rue Racine, 1937. Pp. 212.

KATZ, D., *Animals and Men: Studies in Comparative Psychology.* New York: Longmans, Green and Company, 1937. Pp. xi+263.

RADECKI, W., and ROCHA, R. A., *Manual de psiquiatria.* Buenos Aires, 1937. Pp. 284.

ROBACK, A. A., *Behaviorism at Twenty-Five.* Cambridge, Massachusetts: Sci-Art Publishers, 1937. Pp. 256.

THOMAS, W. I., *Primitive Behavior: An Introduction to the Social Sciences.* New York: McGraw-Hill Book Company, Inc., 1937. Pp. ix+847.

NOTES AND NEWS

THE Fifteenth Annual Meeting of the American Orthopsychiatric Association will be held at the Stevens Hotel in Chicago, Illinois, February 24, 25, and 26, 1938. Dr. Norvelle C. LaMar, secretary, 210 East 68th Street, New York City, New York.

CORRECTION

Through an error, the signature of Dr. Edmund Jacobson's review of K. T. Behanan's *Yoga: A Scientific Evaluation* (PSYCHOL. BULL., 1938, **35**, 46–50) appeared as "Edmund Jacobson, *Laboratory for Clinical Physiology, University of Chicago.*" It should have read "Edmund Jacobson, *Laboratory for Clinical Physiology, Chicago.*"